

HONORABLE THOMAS S. ZILLY

UNITED STATES DISTRICT COURT
WESTERN DISTRICT OF WASHINGTON
AT SEATTLE

INTERNATIONAL BUSINESS MACHINES
CORPORATION,

Plaintiff,

v.

ZILLOW GROUP, INC., and ZILLOW, INC.,

Defendants.

Case No.: 2:20-cv-00851-TSZ

SECOND AMENDED COMPLAINT FOR
PATENT INFRINGEMENT

JURY TRIAL DEMANDED

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INFRINGEMENT
Case No. 2:20-cv-00851-TSZ

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1 **SECOND AMENDED COMPLAINT FOR PATENT INFRINGEMENT**

2 Plaintiff International Business Machines Corporation (“IBM”), for its Second Amended
3 Complaint for Patent Infringement against Zillow Group, Inc. (“Zillow Group”) and Zillow, Inc.
4 (collectively “Defendants” or “Zillow”), alleges as follows:

5 **JURISDICTION AND VENUE**

6 1. This action arises under 35 U.S.C. § 271 for Defendants’ infringement of IBM’s
7 United States Patent Nos. 7,072,849 (the “‘849 patent”), 7,076,443 (the “‘443 patent”), 7,187,389
8 (the “‘389 patent”), 7,631,346 (the “‘346 patent”), 8,315,904 (the “‘904 patent”), 9,158,789 (the
9 “‘789 patent”), and 9,245,183 (the “‘183 patent”) (collectively, the “Patents-in-Suit”).

10 2. This action arises under the patent laws of the United States, including 35 U.S.C. §
11 271 *et seq.* The jurisdiction of this Court over the subject matter of this action is proper under 28
12 U.S.C. §§ 1331 and 1338(a).

13 3. This Court has personal jurisdiction over Zillow Group and Zillow, Inc. because,
14 among other things: Zillow Group and Zillow, Inc. have a regular and established place of business
15 in this judicial district; Zillow Group and Zillow, Inc. have committed, aided, abetted, contributed
16 to and/or participated in the commission of acts giving rise to this action within the State of
17 California and this judicial district and have established minimum contacts within the forum such
18 that the exercise of jurisdiction over Zillow Group and Zillow, Inc. would not offend traditional
19 notions of fair play and substantial justice; Zillow Group and Zillow, Inc. have placed products and
20 services that practice the claims of the Patents-in-Suit into the stream of commerce with the
21 reasonable expectation and/or knowledge that actual or potential users of such products and/or
22 services were located within this judicial district; and Zillow Group and Zillow, Inc. have sold,
23 advertised, solicited customers, marketed and distributed their services that practice the claims of
24 the Patents-in-Suit in this judicial district.

connect with millions of consumers.”² Zillow Group generates revenue at least based on the “sale of advertising under [its] Premier Agent and Premier Broker programs.”³ Zillow Group’s portfolio of real estate and home-related brands includes Zillow. Zillow Group owns and completely controls Zillow, Inc.

9. Defendant Zillow, Inc. is a Washington corporation with a principal place of business at 1301 Second Avenue, Floor 31, Seattle, Washington. Zillow, Inc. may be served with process at its registered agent C T Corporation System, 818 West Seventh Street, Suite 930, Los Angeles, California 90017. Zillow, Inc. also operates the Zillow website, including at least www.zillow.com, www.zillowgroupmedia.com, and subdomains thereof, and the Zillow mobile applications, including at least the iOS and Android Zillow Real Estate & Rentals, Zillow Rentals, and Zillow Premier Agent applications. Zillow, Inc. provides online real estate listings and related services to consumers and local real estate agents through Zillow’s website and through the Zillow mobile applications.

10. Zillow operates “Zillow Offers,” “which allows homeowners to [] sell their home directly to Zillow . . . [and then Zillow] makes certain repairs and updates, and then lists it for sale on the open market.”⁴ .

FACTUAL BACKGROUND

A. IBM Is A Recognized Innovator.

11. IBM is recognized throughout the world as a pioneer in many aspects of science and technology. On eight occasions, more times than any other company or organization, IBM has been awarded the U.S. National Medal of Technology, the nation’s highest award for technological innovation. During IBM’s over-100-year history, IBM’s employees have included six Nobel

² *Id.*

³ *Id.*

⁴ *Id.* at 10.

1 laureates, six Turing awards, five National Medal of Science recipients, and at least twenty-five
2 inventors in the National Inventors Hall of Fame.

3 12. These and other IBM employees have introduced the world to technology that the
4 global community takes for granted today, including the dynamic random access memory—
5 DRAMs—found in nearly all modern computers; magnetic disk storage—hard disk drives—found
6 in computers and portable music players; and some of the world’s most powerful supercomputers,
7 including Deep Blue, the first computer to beat a reigning chess champion and which is on display
8 at the Smithsonian’s National Museum of American History in Washington, D.C. IBM’s
9 commitment to developing these types of advanced computing technologies has helped to usher in
10 the information age.

11 **B. IBM Is Committed To Protecting Its Innovations Through The Patent System.**

12 13. IBM’s research and development operations differentiate IBM from many other
13 companies. IBM annually spends billions of dollars on research and development, yielding
14 inventions that have literally changed the way the world works. For over two decades the United
15 States Patent and Trademark Office (“USPTO”) has issued more patents to IBM than to any other
16 company in the world.

17 14. Like the research upon which the patents are based, IBM’s patents also benefit
18 society. Indeed, the Supreme Court has recognized that the patent system encourages both the
19 creation and the disclosure of new and useful advances in technology. Such disclosure, in turn,
20 permits society to innovate further. And, as the Court has further recognized, as a reward for
21 committing resources to innovation and for disclosing that innovation, the patent system provides
22 patent owners with the exclusive right to prevent others from practicing the claimed invention for a
23 limited period of time.

C. IBM Routinely Licenses Its Patents In Many Fields But Will Enforce Its Rights Against Those Who Use Its Intellectual Property Unlawfully.

15. IBM's commitment to creating a large patent portfolio underscores the value that IBM places in the exchange of innovation, and disclosure of that innovation, in return for limited exclusivity. Indeed, IBM has used its patent portfolio to generate revenue and other significant value for the company by executing patent cross-license agreements. The revenue generated through patent licensing enables IBM to continue to commit resources to innovation. Cross licensing, in turn, provides IBM with the freedom to innovate and operate in a manner that respects the technology of others.

16. Given the investment IBM makes in the development of new technologies and the management of its patent portfolio, IBM and its shareholders expect companies to act responsibly with respect to IBM's patents. IBM facilitates this by routinely licensing its patents in many fields and by working with companies that wish to use IBM's technology in those fields in which IBM grants licenses. When a company appropriates IBM's intellectual property but refuses to negotiate a license, IBM has no choice but to seek judicial assistance.

D. IBM Invented Methods For Presenting Applications And Advertisements In An Interactive Service While Developing The PRODIGY Online Service.

17. The inventors of the '849 patent developed the patented technologies as part of IBM's efforts to launch the PRODIGY online service ("Prodigy"), a forerunner to today's Internet, in the late 1980s. The inventors believed that to be commercially viable, Prodigy would have to provide interactive applications to millions of users with minimal response times. The inventors believed that the "dumb" terminal approach that had been commonly used in conventional systems, which heavily relied on host servers' processing and storage resources for performance, would not be suitable. As a result, the inventors sought to develop more efficient methods of communication that would improve the speed and functionality of interactive applications and reduce equipment capital and operating costs.

1 18. In light of the above considerations, the inventors developed novel methods for
2 presenting applications and advertisements in an interactive service that would take advantage of the
3 computing power of each user's PC and thereby reduce demand on host servers, such as those used
4 by Prodigy. The inventors recognized that if applications were structured to be comprised of
5 "objects" of data and program code capable of being processed by a user's PC, the Prodigy system
6 would be more efficient than conventional systems. By harnessing the processing and storage
7 capabilities of the user's PC, applications could then be composed on the fly from objects stored
8 locally on the PC, reducing reliance on Prodigy's server and network resources.

9 19. The service that would eventually be called Prodigy embodied inventions from the
10 '849 patent when it launched in late 1988, before the existence of the World Wide Web. The
11 efficiencies derived from the use of the patented technology permitted the implementation of one of
12 the first graphical user interfaces for online services. The efficiencies also allowed Prodigy to
13 quickly grow its user base. By 1990, Prodigy had become one of the largest online service providers
14 with hundreds of thousands of users. Prodigy was widely praised in the industry and is still held up
15 as an example of innovation in computer networks that predated even the advent of the World Wide
16 Web. The technological innovations embodied in this patent persist to this day and are fundamental
17 to the efficient communication of Internet content.

18 20. Today, it is easy to take the World Wide Web, powerful computers, and high-speed
19 network connectivity for granted. Not so in 1988, when the first application in the '849 patent's
20 priority chain was filed. The World Wide Web had not even been conceived yet. Typical personal
21 computers at the time had "512K RAM"—not 512 megabytes or gigabytes of RAM, but 512
22 **kilobytes**. '849 patent at 9:16-18. The '849 patent also describes the use of 1,200 to 2,400 bps (bits
23 per second) modems to access a network—a far cry from today's high-speed internet. *Id.* at 9:18-
24 20.

1 21. The limited processing power and network bandwidth available in 1988 posed
2 significant technical obstacles to the development and adoption of network-based interactive
3 services, in which many users may access interactive services provided by a host. *Id.* at 1:34-58.
4 Accordingly, the '849 patent specifically identifies slowdowns in network response time caused by
5 processing bottlenecks at the host as a problem to be solved:

6 [I]n conventional time-sharing computer networks, the data and program
7 instructions necessary to support user sessions are maintained at a central host
8 computer. However, that approach has been found to create processing bottlenecks
9 as greater numbers of users are connected to the network; bottlenecks which require
10 increases in processing power and complexity; e.g., multiple hosts of greater
11 computing capability, if the network is to meet demand. Further, such bottlenecks
12 have been found to also slow response time as more users are connected to the
13 network and seek to have their requests for data processing answered. *Id.* at 10:42-
14 53; see also *id.* at 1:43-52, 10:54-57.

15 As the '849 patent also explains, simply adding additional computing capacity to the hosts is not
16 enough to fix the bottleneck problem. “[E]ven in the case where additional computing power is
17 added, and where response time is allowed to increase, ***eventually the host becomes user saturated***
18 as more and more users are sought to be served by the network.” *Id.* at 10:58-61. In other words,
19 even a host with additional computing capacity would still have limits on how many users it could
20 support in conventional approaches.

21 22. Conventional approaches to providing advertising in interactive services exacerbated
22 the bottleneck problem by clogging limited network bandwidth. In conventional approaches to
23 advertising in interactive services, advertising had to compete with service application data for
24 limited network bandwidth. *Id.* at 2:20-30. That competition between advertising and service
25 application data had “the undesirable effect of diminishing service response time.” *Id.* at 2:25-26.

26 23. The bottleneck problem arises from the limitations of networks that rely exclusively
27 on central hosts to satisfy users’ data processing requests and the limited network bandwidth

1 available at the time of the invention. Accordingly, the bottleneck problem addressed by the '849
2 patent is a "technical problem."

3 24. Some of the technical solutions and innovative aspects of the '849 patent are set forth
4 in the technology tutorial that IBM submitted in the *IBM v. Groupon* litigation. Ex. 71 at timestamp
5 1:37.

6 25. Before this suit, the '849 patent had been challenged three times on grounds of alleged
7 patent ineligibility. Those challenges were all unsuccessful. In the matter of *IBM v. The Priceline*
8 *Grp., Inc.*, C.A. No. 1:15-cv-00137 (D. Del.), the defendants (collectively "Priceline") filed a motion
9 to dismiss, alleging that the '849 patent was directed to unpatentable subject matter. The Delaware
10 court denied Priceline's motion, finding that "Defendants have failed to meet their burden of
11 demonstrating that . . . claim 1 of the '849 patent [is] devoid of inventive concepts." *IBM v. The*
12 *Priceline Grp., Inc.*, 2016 WL 626495, at *24 (D. Del. Feb. 16, 2016) (attached as Ex. 72.)

13 26. In the matter of *Kayak Software Corp. v. IBM.*, CBM2016-00075, Priceline again
14 challenged the '849 patent on alleged patent eligibility grounds, this time before the Patent Trial and
15 Appeal Board ("PTAB"). Just like in the district court, the PTAB rejected Priceline's challenge.
16 The PTAB "agree[d] with Patent Owner the disclosure of the '849 patent itself is almost exclusively
17 directed to solving a problem arising in computer technology (i.e., bandwidth) with a computerized
18 solution (i.e., local storage)." Ex. 73 (*Kayak Software Corp. v. IBM.*, CBM2016-00075, Paper 16
19 (PTAB Dec. 15, 2016)) at 19. The PTAB thus concluded, "Petitioner has not shown sufficiently that
20 independent claims 1 and 21 are directed to an unpatentable 'abstract idea'" *Id.* at 20.

21 27. Although the parties filed other summary judgment motions in the *Priceline* case,
22 Priceline chose not to file a summary judgment motion to challenge the patent eligibility of the '849
23 patent.

24 28. In the matter of *IBM v. Groupon, Inc.*, C.A. No. 1:16-cv-00122 (D. Del.), Groupon,
25 Inc. ("Groupon") moved for judgment on the pleadings that the '849 patent was directed to ineligible

subject matter. The court denied Groupon’s motion, finding that “the asserted claims for the Filepp patents are not directed to an abstract idea and are directed to patent-eligible subject matter.” *IBM v. Groupon, Inc.*, 289 F. Supp. 3d 596, 607 (D. Del. 2017) (attached as Ex. 74).

29. Although the parties filed other summary judgment motions in the *Groupon* case, Groupon chose not to challenge the patent eligibility of the ’849 patent. The case proceeded to trial. The jury rendered a verdict of willful infringement and no invalidity on all four of the patents-in-suit, including the ’849 patent, thus further showing the continued importance and relevance of the invention of the ’849 patent to modern network technology. Ex. 75 at 1-2.

30. The matters of *IBM v. Expedia* and *IBM v. Airbnb* also involved the ’849 patent. None of the defendants in those litigations filed motions that challenged the patent eligibility of the ’849 patent.

E. IBM Invented Methods For A Runtime User Account Creation Operation Using A Single-Sign-On Process In A Federated Computing Environment.

31. The inventors of the ’346 patent developed the patented technology as part of IBM’s efforts to improve single-sign-on technology. Online service providers, like website operators, typically use “sign-on” operations to manage access to protected resources, like confidential webpages. ’346 patent at 6:26-30. A user signs-on by providing authentication credentials, such as a username and password, which the service provider verifies to authenticate the user’s identity. *Id.* at 6:31-36. Then, the service provider can determine whether the identified user has authorization to access the protected resource and, if so, grants access. *Id.* at 6:37-43, Fig. 1C. Although that process has become commonplace, it is time consuming for users to sign-on every time they wish to access a protected resource. *Id.* at 1:25-33.

32. One way to address the shortcomings of repetitive sign-on operations is to authenticate users for an entire “session,” *i.e.*, a series of multiple transfers of information between the server and the client. *Id.* at 1:53-61, 6:17-22. That technology is called *single*-sign-on because

1 users are only required to sign-on once per session. *Id.* at 1:53-61. For example, users could enter
 2 a user name and password on the homepage of a service provider and request multiple protected
 3 webpages without reentering their credentials. But prior art single-sign-on methods were
 4 problematic because they required users to have preexisting user accounts at the service provider.
 5 *Id.* at 2:19-42.

6 33. As Dr. Heather Hinton, first named inventor of the '346 patent, testified in prior
 7 proceedings, prior art systems could not take advantage of the full benefits of single-sign-on because
 8 of this fundamental problem.⁵

9 34. The inventors of the '346 patent sought to develop single-sign-on technology that
 10 would permit a new user of a service provider to access protected resources. They developed novel
 11 methods for systems interacting within a “federated computing environment” to trigger a single-
 12 sign-on operation on behalf of a user that would obtain access to a “protected resource” and create
 13 an account for the user. The specification discloses how to structure a “federated computing
 14 environment” using a nonconventional arrangement of computer components. *Id.* at 10:62-11:7,
 15 11:28-35. The specification describes a “protective resource” using precise technical terms that
 16 demonstrate “how” to solve the limitations of prior art single-sign-on operations. *Id.* at 5:60-67,
 17 6:26-30, 8:45-48, 11:28-35. And it specifies the “ordered combination” of technical steps necessary
 18 to implement the claimed embodiments. *See, e.g., id.* at Figs. 9, 11.

19 35. One implementation of the '346 patent involves using “tokens” to facilitate such
 20 interactions. “A token provides direct evidence of a successful operation and is produced by the
 21 entity that performs the operation, e.g., an authentication token that is generated after a successful
 22 authentication operation. A Kerberos token is one example of an authentication token that may be
 23 used with the present invention.” *Id.* at 8:49-54. Such binary security tokens can implement web
 24 services message-level security. When a user accesses a service provider and signs into the identity

25 ⁵ See Ex. 76 at 383:17-386:6 (Heather Hinton’s Testimony in *IBM v. Groupon*)

1 provider via single-sign on operations, the identity provider authenticates the user. The identity
 2 provider provides a token to the service provider “to provide proof of authentication of a user.” *Id.*
 3 at 22:15-19. The service provider would in turn, “translate” the identity provider’s token into a
 4 “locally valid user identifier...based on information contained in the [] token” in order to “build a
 5 local session for the user.” *Id.* at 24:16-25:3. After the user has been found to be authenticated by
 6 the identity provider, the system provider can then create an account for the user at the service
 7 provider, thus bypassing any requirement for the user to directly create an account at the service
 8 provider.⁶ The ’346 patent thus extends the benefits of single-sign-on technology to allow the user
 9 to access protected resources at any number service providers without having to first set up a user
 10 account.

11 36. Some of the technical solutions and innovative aspects of the ’346 patent are set forth
 12 in the technology tutorial that IBM submitted in the *IBM v. Groupon* litigation. Ex. 71 at timestamp
 13 10:39.

14 37. Before this suit, the ’346 patent had been unsuccessfully challenged on grounds of
 15 alleged patent eligibility. In the matter of *IBM v. The Priceline Grp., Inc.*, C.A. No. 1:15-cv-00137
 16 (D. Del.), Priceline filed a motion to dismiss, alleging that the ’346 patent was directed to
 17 unpatentable subject matter. The Delaware court denied the motion, finding the patent was not
 18 directed to an abstract idea; “the true heart of the invention is the utilization of SSO technology to
 19 automatically create an account at the service provider level on behalf of users who did not
 20 previously have such accounts, all in order to allow the user to access protected resources at the
 21 service provider.” *IBM v. The Priceline Grp., Inc.*, 2016 WL 626495, at *16 (D. Del. Feb. 16, 2016)
 22 (attached as Ex. 72). The Court also rejected the argument that the claim did not contain inventive
 23 aspects: “The specification describes the improvement over the prior art encompassed by the

24 ⁶ See Ex. 76 at 380:14-383:1, 386:7-388:11 (Heather Hinton’s Testimony in *IBM v. Groupon*)
 25 (describing the “token” implementation of the ’346 patent as disclosed in the TFIM System Design Document).

1 invention as the ‘eliminat[ion] [of] these prerequisites’ because while ‘[i]n the prior art, the service
2 provider cannot automatically create an active session for the user and allow access to protected
3 resources; with the present invention, the service provider dynamically performs a runtime linked-
4 user-account creation operation at the service provider by creating a linked user account based on
5 the user identity . . . that has been provided by the identity provider to the service provider[.]’” *Id.*
6 at *19.

7 38. Although the parties filed summary judgment motions in the *Priceline* case, Priceline
8 chose not to file a motion to challenge the patent eligibility of the ’346 patent.

9 39. In the *IBM v. Groupon* case, Groupon chose not to file any motions challenging the
10 patent-eligibility of the ’346 patent at the pleading stage or at the summary judgement stage. The
11 case proceeded to trial. The jury rendered a verdict of willful infringement and no invalidity on all
12 four of the patents-in-suit, including the ’346 patent, thus further showing the continued importance
13 and relevance of the invention of the ’346 patent to modern network technology. Ex. 75 at 1-2.

14 40. The matters of *IBM v. Expedia* and *IBM v. Airbnb* also involved the ’346 patent.
15 None of the defendants in those litigations filed motions that challenged the patent eligibility of the
16 ’346 patent.

17 41. The Federal Circuit has interpreted the claims of the ’346 patent in an appeal
18 concerning two final written decisions issued by the PTAB. In reversing the PTAB’s finding that a
19 subset of claims of the ’346 patent were anticipated by prior art, the Federal Circuit explained that
20 the ’346 patent solves “the special challenges of providing single-sign-on capabilities in a ‘federated’
21 environment,” which the court understood as an environment containing different enterprises that
22 “adhere to certain standards of interoperability.” *IBM v. Iancu*, 759 Fed. Appx. 1002, 1004-1005
23 (Fed. Cir. 2019) (attached as Ex. 77). The Federal Circuit distinguished how the prior art approached
24 authentication from how the ’346 patent solved the problem by looking at how the claimed
25 “federated computing environment” and “single-sign-on” operated in the context of the invention.

1 *Id.* at 1007-1009. The Federal Circuit’s opinion confirms that the ’346 patent is directed to a non-
2 abstract computer-specific problem and involves innovation in “how” to solve the limitations of
3 prior art single-sign-on techniques.

4 **F. IBM Invented Artificial Intelligence Techniques For Determining The Condition Of A**
5 **Geographic Area By Directly Analyzing Unstructured Image Data Using Supervised**
6 **Learning.**

7 42. Artificial intelligence (AI) and Machine Learning are two fields of computer science
8 which focus on inventing new technologies that provide computers with the ability to “learn” and
9 “think” on their own, without human intervention. More specifically, AI is concerned with creating
10 computers that have the ability to discover insights on their own. AI often uses machine learning to
11 achieve this goal. Machine learning researchers create solutions that allow computers to learn from
12 sets of data, and make predictions and decisions based on said data, in a way that mimics human
13 “learning” or “thinking” but that is inherently wholly different from how humans “learn” and
14 “think.”

15 43. IBM is a pioneer in both AI and machine learning. As early as the 1950s, IBM
16 computer scientists began working on “chess computing,” or teaching a computer to play chess. In
17 order for a computer to successfully play a game of chess, it must have the ability to make decisions
18 about which moves to make, as a person would. IBM’s efforts culminated in Deep Blue, a chess
19 computer pictured below. Deep Blue’s computing system used various algorithms and machine
20 learning tools to consider over 200 million possible chess positions per second, in order to select the
21 move with the greatest probability of success. On May 11, 1997, Deep Blue defeated the reigning
22 world chess champion, Garry Kasparov, after a six-game match:
23
24
25



Ex. 32 (<https://www.ibm.com/blogs/think/2017/05/deep-blue/>).

44. From Deep Blue, IBM went on to develop even more advanced AI and machine learning technologies, including Watson, IBM's suite of AI and machine learning-based services and applications. Watson additionally uses Natural Language Processing (NLP), or the ability of a computer to read and understand sentences as a person would, to further approximate "thinking" like a human using complex processes uniquely tailored to the limitations of computers and machine languages. To this day, IBM's Watson technology has been applied to solve numerous real-world problems, such as city infrastructure planning and personalized school curriculum design, among many others. In 2011, an IBM Watson computer even defeated two Jeopardy! quiz show champions:



Ex. 33 (<https://www.cbsnews.com/news/ibm-watson-defeats-humans-in-jeopardy/>).

45. Computer vision is a sub-field of AI and machine learning technology, which focuses on teaching computers to “think” like a human in order to “see” and derive information from visual images. Researchers and companies in various industries have long been interested in creating computer systems that can make decisions by analyzing image and video data. For example, in the real estate industry, a computer system may analyze a picture of a house, and determine that the house has image patterns that correlate with certain positive or negative characteristics. The computer system may then assign a score to the house indicating its condition or generate an appraisal of the house’s value. Automating tasks like computing house ratings or generating appraisals with a computer system can greatly benefit the real estate industry by allowing computers to perform tasks that were previously left to humans. A computer can also improve the accuracy of real estate appraisal algorithms by incorporating image and video data, which traditionally have not been used extensively in automated real estate appraisals.

46. However, computers face challenges when interpreting image and video data. Some of these challenges stem from the distinction between structured and unstructured data. Structured data is organized and formatted in a way that allows a computer to easily process it for a given application using conventional approaches. For example, data about a house—like its address, zip code, and city—may reside in a table in a relational database, like the table shown below:

Residence					
Type	Street	City	State	Zip	Occupied
House	123 Main St.	Franklin	Tennessee	37064	Yes
Apartment	456 Broadway	Springfield	Missouri	54321	No
Condo	789 East Ave.	Metropolis	Illinois	13579	No

This data is “structured” since a computer can use conventional approaches to process the data for certain applications. For example, a computer can easily generate a listing of unoccupied residences by using conventional Structured Query Language (SQL) to retrieve all the records from the table where the “Occupied” field is “No.”

47. In contrast to structured data, unstructured data is not organized or formatted in a way that would allow a computer to process the data for a given application using conventional approaches. For example, an image of a house may contain a swimming pool. The image file consists of a sequence of pixels, each with different red-green-blue (“RGB”) values. This data is well-structured for a computer to display the image through a conventional photo application by computing the values of individual pixels. However, the image is unstructured for other tasks, such as determining whether the image contains a swimming pool. A human looking at the image can use instinct, common sense, and experience to quickly determine that the image displays a house with a swimming pool. However, a computer cannot use instinct, common sense, and experience the same way a human can to make this classification. And the computer cannot determine that the image contains a swimming pool through conventional methods like computing the RGB values of

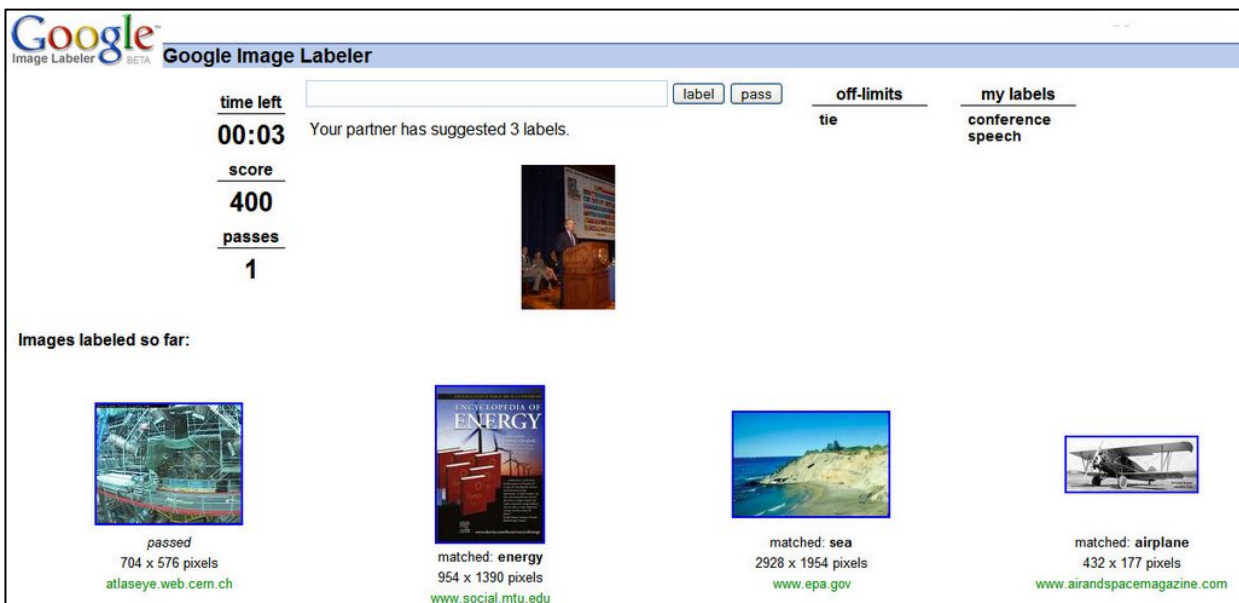
1 individual pixels comprising the image. Thus, a need existed for the capability of computers to
2 interpret such unstructured data.

3 48. At the time of the invention of the '183 patent, a number of conventional methods
4 were used by computers to interpret unstructured image and video data, such as pictures or videos
5 of houses. However, each of these prior methods differed from the patented invention of the '183
6 patent and had significant disadvantages. One such method was the "manual labeling" approach to
7 interpreting image and video data, in which a computer extracted information from an image by
8 using human-created labels or scores as proxies for information contained within the image. For
9 example, a human data processor may label and score different aspects of an image of a home, such
10 as a broken window and a missing shingle, and then feed the labeled image into the computer system.
11 The computer detected the human-created labels "broken window" and "missing shingle" and scored
12 the image according to those labels.

13 49. The "manual labeling" approach differs from the patented invention of the '183
14 patent because the computer in a manual labeling system analyzes the label rather than the image to
15 extract information about the image. The "manual labeling" approach also suffers from several
16 downsides. A computer typically must train on thousands or millions of labeled images to
17 consistently make accurate predictions. Data processors must caption, label or score each individual
18 image, which may take months or years, and cost tens of thousands of dollars. Human data
19 processors are also prone to error and bias. A data processor may forget to label a missing shingle
20 in an image of a home. A realtor may choose not to label the missing shingle or broken window to
21 achieve a higher home valuation. Human data processors may also fail to evaluate individual
22 features of a home. For example, a data processor may label a home as containing a swimming pool,
23 but neglect to assign a score or descriptive label to the swimming pool, preventing the computer
24 from accurately assessing that individual aspect of the image.

50. Another method of the prior art was the “crowdsourcing” approach to interpreting image and video data, in which a computer interpreted image data by collecting labels sent by a large number of people over the internet. The computer assigned the most popular labels to the image and interpreted the image according to those labels. For example, if most users labeled a certain aspect of an image as a “broken window”, the computer would assign the label “broken window” to that aspect and interpret the image according to that label.

51. One example of crowdsourcing is the Google Image Labeler, launched by Google in 2006. Through the Image Labeler game, Google enlisted the help of millions of online users in order to choose the category of features found within Google’s database of images. In the game, two different users would be shown the same set of images, and each player would earn points for giving the same label or category (such as “Dogs,” “Cats,” “Food,” “Cars,” etc.) to a photograph. Google used these user-inputted labels to improve its image classification software. An example of Google Image Labeler gameplay is shown below:



Ex. 34 (Google Image Labeler, Google Operating System: Unofficial news and tips about Google, <http://googlesystem.blogspot.com/2006/09/google-image-labeler.html>).

52. However, just like the “manual labeling” approach, the “crowdsourcing” approach differs from the patented invention of the ’183 patent because the computer analyzes the label rather than the image to extract information about the image. The crowdsourcing approach also suffers from the same problems as manual labeling, including the risks of human bias and error. Crowdsourcing encounters other challenges as well. A home appraisal company must spend time and money identifying a large number of users willing to provide labels, and then send the images to those users. The company may also need to provide guidance to the users about how to label the images. Furthermore, the risk of inconsistently applied labels increases as the crowd gets larger.

53. Another prior art method was the “metadata” approach to interpreting image and video data, in which a computer extracted labels from the webpage displaying the image. For example, a webpage displaying an image of a home with a broken window may contain an HTML tag indicating that the home contains a broken window. This HTML tag is metadata because it describes the image data contained on the webpage. The computer can read this HTML tag to determine that the home contains a broken window and interpret the image according to this label.

54. The metadata approach differs from the invention of the ’183 patent because the computer classifies the image by extracting data from the webpage rather than directly analyzing the image itself. The metadata approach also suffers from several downsides. A webpage’s HTML may not tag all of the relevant features of the image, such as a broken window. Also, the webpage owner may change the tag for a particular feature, requiring the computer system to update its search criteria to detect the new tag. For example, the webpage owner may change the tag “broken window” to “window that is broken.” The computer system must then update its search criteria to detect images containing this new tag. Updating the computer system every time a webpage’s metadata changes is time-consuming, expensive, and inefficient.

55. Yet another prior art approach was the “unsupervised machine learning” (UL) approach to interpreting image data, in which the computer directly analyzed the image without

1 relying on human-created reference data. The computer may use a variety of methods to interpret
2 the image without reference data, such as by grouping together images of homes that contain broken
3 windows, or recognizing that homes with broken windows are also missing shingles.

4 56. A UL system differs from the invention of the '183 patent because it interprets image
5 data without using any human-created reference data (such as historical baseline values). A UL
6 system also suffers from numerous drawbacks. A UL system cannot standardize inputs and outputs
7 because the possible features and scores of the image data are not known until the UL system finishes
8 processing the image. This lack of standardized input and output makes it difficult to incorporate a
9 UL system into an algorithm, such as a real estate appraisal algorithm. Moreover, without reference
10 data, a UL system cannot easily improve its accuracy based on past classifications, but instead must
11 generate new classifications every time it processes new image data. The UL system therefore can
12 only make precise predictions after it has processed a large amount of data.

13 57. Another approach to interpreting image data is analyzing a geographic area to detect
14 individual features, and then assigning a score to the overall geographic area based on those features.
15 This approach differs from the invention of the '183 patent because it only scores the geographic
16 area as a whole, and fails to score individual locations within that area. For example, a computer
17 may detect a lawn in front of a home, and use that feature to assign an overall score to the home.
18 But the computer does not assign a score to the lawn itself. A system that fails to score individual
19 features cannot make nuanced yet valuable real estate classifications. For example, a user may put
20 particular weight on the conditions of lawns in a particular neighborhood when browsing real estate
21 listings. But the computer cannot tailor its scoring of real estate listings for this particular user
22 according to the quality of the lawns, since the computer never assigns a score to that particular
23 feature within the geographic area.

24 58. In sum, the prior art used a number of conventional approaches to interpret image
25 data through a computer system, all of which encountered significant challenges. Some of these

1 prior art methods—like manual labeling, crowdsourcing, and metadata extraction—used
2 conventional techniques to process image data through human-created proxies, like labels and
3 HTML tags. Other methods—like unsupervised machine learning—used conventional techniques
4 to directly analyze the image. However, these techniques failed to analyze the image data directly,
5 did not use human reference data, did not standardize inputs or outputs, and/or did not assess
6 individual features and locations in a geographic area.

7 59. The inventors of the '183 patent improved on these methods by conceiving of an
8 innovative and unconventional way for computers to directly assess and score geographic location
9 data, like images and videos. '183 patent at 3:46-4:17. Their approach started with the idea that
10 there existed in the world a large amount of publicly-available, unutilized geographic location data,
11 such as images and videos. *Id.* at 3:7-12. Examples of this geographic location data include video
12 feeds from security cameras, photos taken on cell phone cameras and then uploaded to social media
13 and the Internet, images and videos from news stories, and even non-image data like heat waves,
14 radiation, and magnetism. *Id.* at 3:7-12, 4:8-17. For example, house hunters trying to locate a
15 neighborhood or a specific home had access to a large quantity of publicly-available image data
16 showing the conditions within these homes or neighborhoods. *Id.* at 3:7-12. Programs like Google
17 Street View captured large amounts of image data that contained information about qualities
18 determinative of whether a neighborhood, or a particular home within a neighborhood, is desirable,
19 such as whether a property has well-maintained landscaping, intact windows, ample lighting from
20 street lamps, freshly painted walls, or no graffiti. *Id.* at 4:27-31, 4:52-57, 5:3-8; Figs. 2A-C.

21 60. But while this data contained valuable information about its subject matter, it was not
22 structured to allow the computer to detect individual geographic features in the data and assign
23 condition scores to the data using conventional techniques. For example, a computer could not use
24 conventional statistical analysis to determine that an image of a house contained a broken window
25 and assign a condition score to that feature. The inventors of the '183 patent recognized that a

1 computer system that can directly analyze individual features of an image or a video, with guidance
2 from human created reference data but without the need to manually label every relevant feature of
3 a geographic area, would greatly improve automated real estate appraisal algorithms.

4 61. With these goals in mind, the inventors of the '183 patent created a novel and
5 unconventional technique for a computer to determine a score representing the location conditions
6 of a given geographic location—like a home, neighborhood, or city— by directly analyzing the
7 image data, scoring individual features in the geographic area through comparison to reference data,
8 and accounting for user preferences.

9 62. The invention of the '183 patent contains several inventive aspects. First, the
10 invention disclosed the ability to assign scores to geographic location data like images by directly
11 analyzing the data itself, rather than interpreting human-created proxies of the underlying data. '183
12 patent at 3:25-28. The system obtains data from a geographic location, such as an image or video,
13 and directly analyzes that data to identify elements in the data, such as broken windows or damaged
14 cars. *Id.* at 3:28-32; Figs. 2A-C. The system assigns a score to the geographic location based on
15 the detected features. *Id.* at 4:34-51, 5:9-20. The system further calculates condition scores for
16 entire geographic areas and generates a map indicating the condition scores of geographic locations
17 based on the detected elements. *Id.* at 4:50-51, 5:20-31. The system can generate a map showing
18 average condition scores at different levels of granularity, such as at the street, neighborhood, or city
19 level. *Id.* at 6:17-29; 6:39-41; Figs. 3A-B. Furthermore, the system improves upon prior art methods
20 by interpreting a wide range of unstructured data—not just images and videos—but also information
21 about physical stimuli, like heat, motion, or pressure. *Id.* at 4:13-17.

22 63. For example, the '183 patent describes “[c]apturing image data associated with a
23 known location (a geographic area) . . . from, inter alia, traffic cameras, security cameras, personal
24 cameras, etc.” '183 patent at 3:46-48; Fig. 1. The system then “[a]nalyz[es] contents within an
25 image for discrete elements aligned to categories representative of various environmental

1 conditions.” *Id.* at 3:51-53; Figs. 2A-C. The system “scor[es] each element relative to an identified
2 ‘best’ and ‘worst’ case state.” *Id.* at 3:58-59; Figs. 2A-C. The patent further states that “[t]he
3 generated scores are plotted on a scalable map, table, or chart for reference”, and that the map may
4 “indicate[] [an] overall condition score value associated with [a] specified geographical area.” *Id.*
5 at 3:42-43, 2:16-18; Figs. 3A-B. The patent also describes methods of interpreting a wide range of
6 unstructured data, such as “heat, light, sound, pressure, magnetism, and/or a particular motion.” *Id.*
7 at 4:13-17. The patent states that “with respect to the non-image data,” “condition score values
8 associated with multiple locations are . . . “interpolated.” *Id.* at 6:54-58; Figs. 4-5. The methods and
9 systems of the ’183 patent therefore describe the inventive concept of computing condition scores
10 for a geographic location by directly analyzing unstructured data, rather than merely interpreting
11 human proxies for that data.

12 64. Another inventive aspect of the ’183 patent is the ability to assess individual features
13 of a geographic area, and use those assessments to personalize condition scores and location results
14 for particular users. ’183 patent at 3:46-4:17. This aspect is an improvement over the prior art
15 systems and methods, which produced condition scores for the overall area rather than individual
16 features. The ’183 patent discloses detecting individual elements in data associated with a
17 geographic location and assigning a score to each individual element. *Id.* at 3:58-65; Figs. 2A-
18 C. The system can also aggregate scores across elements to compute a score for an entire geographic
19 location. *Id.* at 5:20-37; Figs. 3A-B. A user can also tailor their search by identifying relevant
20 elements. *Id.* at 3:66-4:3. For example, a user may want to view homes with high-scoring lawns,
21 yet remain indifferent to the types of cars in the neighborhood. The user can use the technology of
22 the ’183 patent to perform a search for homes matching their preferences. The system and methods
23 of the ’183 patent enable this type of personalization by scoring individual elements and locations
24 in a geographic area—an unconventional approach not found in the prior art. *Id.* at 3:46-4:17. For
25 instance, the ’183 patent states that “a single image may comprise multiple elements each comprising

1 associated scores.” *Id.* at 3:64-65. Indeed, the system “[a]nalyz[es] contents within an image for
2 discrete elements aligned to categories representative of various environmental conditions,” which
3 are then used to identify the “key conditions [by] ... comparing the elements to a database of stored
4 images.” *Id.* at 3:51-53, 4:32-34.

5 65. The ’183 patent goes on to describe “[a]n algorithm [that] is enabled for scoring each
6 of the key conditions.” ’183 patent at 4:34-35; Fig. 4. Such an algorithm is captured in the claims,
7 which recite, for example, “comparing . . . image data to a plurality of stored image data . . . [which]
8 comprise baseline measurement values associated with an expected condition level,” “calculating .
9 . . condition score values [that] indicate real time condition values associated with a plurality of
10 locations,” and “calculating . . . an overall condition score value associated with said specified
11 geographic area.” *Id.* at 10:17-30, 11:24-36, 12:38-51. The ’183 patent further states that
12 “[a]dditional aggregate scores may be generated by averaging all of the aforementioned scores.” *Id.*
13 at 5:28-29.

14 66. The ’183 patent further describes an unconventional algorithm enabling a computer
15 to compute condition scores using baseline data. ’183 patent Fig. 4. First, “historical image[s] [are]
16 stored with a preconfigured image type, a preconfigured condition score, and a specified location
17 identifier.” *Id.* at 5:60-63. After the system establishes all of the reference images, “a steady state
18 mode for analysis is initiated.” *Id.* at 5:67. Next, “an updated image is obtained” and “a matching
19 (or similar image) is retrieved from the index database.” *Id.* at 6:1-2. The ’183 patent goes on to
20 state that “if [] it is determined that the variance values do comprise a difference sufficient for
21 reevaluation then [] condition scores are recalculated” and “the matching image and recalculated
22 condition scores are stored.” *Id.* at 6:8-12.

23 67. The ’183 patent also describes how the inventive concept of individual feature
24 scoring is used to create more granular search criteria for users. The system allows users to “select
25 elements relevant to a subjective view of neighborhood conditions” such as “a condition of buildings

1 and cars with respect to street conditions, tree conditions, etc.” ’183 patent at 3:66-4:3. The system
2 then “calculates a score for each location associated with retrieved image data based on elements
3 and weightings selected by the user.” *Id.* at 4:4-7. The ’183 patent therefore describes the inventive
4 concept of directly analyzing image data about a geographic area and scoring individual features and
5 locations within that area, both to compute an aggregate score for the entire area, and to allow users
6 to tailor their searches based on preferences for certain conditions. This granular and personalized
7 scoring of geographic location data is an improvement over prior art systems and methods which
8 only scored the geographic area as a whole.

9 68. Another inventive aspect of the ’183 patent is the use of human-created reference
10 data to compute scores for geographic locations, in the form of a “condition index database”
11 containing “historical image[s].” ’183 patent at 5:58-67. This unconventional approach is an
12 improvement over prior art systems which used unsupervised machine learning to score locations
13 without any baseline data. These unsupervised systems generated unpredictable and unstandardized
14 classifications and scores that were difficult to incorporate into automated algorithms. The inventors
15 of the ’183 patent improved on such systems by conceiving of an unconventional method for
16 computers to score geographic location data in a standardized and predictable way by utilizing pre-
17 configured baseline data from an “index database.” *Id.* at 5:67-6:15.

18 69. The ’183 patent also discloses storing historical reference data for later reference.
19 ’183 patent at 6:10-12. Each piece of such reference data contains a “preconfigured image type, a
20 preconfigured condition score, and a specified location identifier.” *Id.* at 5:60-63. When the
21 computer system interprets real-time data, it can compare the real-time data with that reference data.
22 *Id.* at 6:2-4. If the system determines that the real-time data represents the same location as the
23 reference data, the system can compare the real-time data with the reference data to determine
24 whether the preset condition scores for that location have changed. If the scores have changed, the
25 system can update the scores for the reference data and score the real-time data accordingly. *Id.* at

6:2-12. By using this unconventional approach of computing condition scores using baseline reference data, the invention of the '183 patent clearly defines the scored conditions and produces predictable and standardized output that can be easily incorporated into an algorithm, such as a real estate appraisal algorithm.

70. Moreover, the algorithm described in the '183 patent ties together the inventive concepts of the invention into an "ordered combination," specifically enabling computers to directly evaluate and score geographic location data. '183 patent Fig. 4. For example, after the system compares the real-time images to the baseline images, "scores for addresses without images are interpolated." *Id.* at 6:16-17. The algorithm also includes a step for receiving "user input factors or default factors (associated with geographical condition attributes)." *Id.* at 6:52-54. The algorithm goes on to describe scoring individual features of a given geographical location, stating that "street condition scores associated with streets located within the specific geographical area and neighborhood condition scores associated with neighborhoods comprising the streets are calculated." *Id.* at 6:60-63.

71. The '183 patent therefore describes a novel and unconventional system and method specifically conceived to enable computers to directly analyze and score geographic location data.⁷ Indeed, the inventors of the '183 patent recognized that these systems and methods could achieve real-world impacts that were simply unattainable by prior art methods. For example, the inventors of the '183 patent envisioned that the claimed invention could be used to further IBM's Smarter Cities efforts, in order to improve neighborhood public safety.

72. The IBM Smarter Cities initiative focuses on using technologies like AI and big data to improve the functioning of city governments, as well as the quality-of-life of citizens in general.

⁷ For further discussion of the computer-specific problems to which the claims are directed and inventive aspects therein, see the Declaration of Dr. Douglas Schmidt (attached herein as Ex. 78), and the Declaration of Richard Haas, (attached herein as Ex. 79), the first named inventor of the '183 patent.

The '183 patent's inventors recognized that the novel and unconventional techniques of the patent could be used by local police departments to augment public safety efforts and improve the efficiency of the police force. Police departments could use the invention of the '183 patent to automatically convert streams of security camera footage into condition scores which give a clear indication of which areas are at high risk, and may require police presence. For example, an area with a burning fire, congregating individuals, and cars with broken windows would be given an overall condition score value corresponding to a high risk situation, and the local police would be alerted that police attention is needed in that area. By providing greater situational intelligence in a hyper-localized context, the invention of the '183 patent could significantly reduce crime levels by increasing the efficiency of the police force—a real-world impact of the '183 patent that is a drastic improvement over the prior art.

73. Zillow itself acknowledges many of the inventive concepts of the '183 patent. In a June 27, 2019 article, Zillow stated that its home valuation tool “the Zestimate” is “getting an upgrade,” and the “new Zestimate uses computer vision to analyze photos of a home to understand not just its facts and figures, but its quality and curb appeal.”⁸ Zillow explained that computers assess image data differently than humans, noting that “there was no way for computers to look at photos of a home and get the same information that humans do.”⁹ Zillow went on to point out that a computer system which directly analyzes image data is inventive, writing that “incorporating computer vision and advanced machine learning models into the Zestimate algorithm enables us, for the first time, to give consumers a more quantitative accounting of the qualitative aspects of their home.”¹⁰ Zillow also appreciated the value of a computer system that can evaluate image data by comparison to baseline data, writing that “we’ve taught the Zestimate to discern quality by training

⁸ Ex. 96 (<https://medium.com/@StanHumphries/introducing-a-new-and-improved-zestimate-algorithm-7a5b831712c7>) at 2.

⁹ *Id.*

¹⁰ *Id.*

convolutional neural networks with millions of photos of homes on Zillow.”¹¹ Zillow further recognized that Zestimate’s ability to directly analyze image data about homes benefits the real estate industry, declaring that “photos provide consumers a rich source of information about a home’s quality” and that “[t]hanks to these improvements. . . Zestimate now has a median error rate of less than 2 percent for homes listed for sale, meaning half of all Zestimates fall within 2 percent of the home’s eventual sales price” and “[i]ncorporating these new technologies and data sources . . . helps provide a more accurate home value estimate.”¹² Zillow’s statements are further evidence that the systems and methods of the ’183 patent are novel and unconventional.

G. IBM Invented Methods That Allowed Users To Precisely Select And Filter Search Results Within Geographic Areas Of Interest On A Computer-Implemented Graphical User Interface By Synchronizing Map Displays And List Displays.

74. The inventions of the ’789 patent provide a new way of filtering and presenting geospatial data in response to user interaction. At the time of the inventions of the ’789 patent, increases in computing power and storage allowed an ever-growing amount of data to be stored in digital databases. A common type of data was geospatial data—that is, data that can be represented on a map—which presented additional specific challenges. An example of geospatial data are points of interest, which can be indicated with icons that are overlaid on a map. The computing devices of the time were able to search through millions of such points of interests and display those results in a map, as well as displaying information about those results. At the same time, advances in computing devices allowed users to interact with the results in new ways, such as allowing a user to click an area of the map occupied by an interactive icon to display a balloon containing additional information about said icon.

75. However, the technology at the time limited how that data could be displayed and how users were able to interact with it. In particular, the mapped geospatial data was not dynamically

¹¹ *Id.*

¹² *Id.*

1 responsive to the user's selections in the way claimed by the inventors of the '789 patent. In the
2 prior art, users were presented with all, or a set number, of results that fit within the area of the screen
3 designated for the map, and users could not select a subset of data to be displayed in the way claimed
4 by the '789 patent. For example, when results were displayed on a map in response to a user's search
5 for hotels, the user could not then select a subset of the hotels to automatically update the map to
6 only show the selected hotels. The prior art's approach to providing search results thus had several
7 limitations. While helpful for users to be able to visualize the location of search results, prior art
8 approaches did not allow for a user to create a customized search area to fit a user's specific
9 geographical needs. For example, a person searching for rental properties may want to search within
10 an irregular shaped area determined by the acceptable walking distances between several modes of
11 public transportation. Or they may wish to create a search that excludes particularly noisy blocks,
12 tourist attractions, or neighborhoods that they wish to avoid.

13 76. The inventors of the '789 patent encountered these obstacles in their development of
14 IBM's Intelligent Operations Center for Smarter Cities ("IBM's IOC"), which allowed personnel in
15 command centers to track conditions and events on an interface containing a geospatial map and an
16 associated list display. For example, in IBM's IOC, city personnel could monitor a wide range of
17 city assets, from sidewalks and sewers to police cars and traffic lights. The software drew on
18 information collected from multiple sensors, such as traffic cameras and rain meters, to enable
19 personnel to quickly assess the status of assets and their impact on particular city services. During
20 events, these personnel could use the software for real-time monitoring and to coordinate responses,
21 such as placing traffic signs at different locations, or transporting police. But these personnel also
22 needed to be able to interact with the map to select specific city assets or ensure city resources were
23 ready for emergencies. Further, they needed to be able to track different categories of conditions
24 and components. For example, city personal might need to track the conditions of water lines at the
25 same time they track the conditions of transportation resources. A solution was needed that allowed

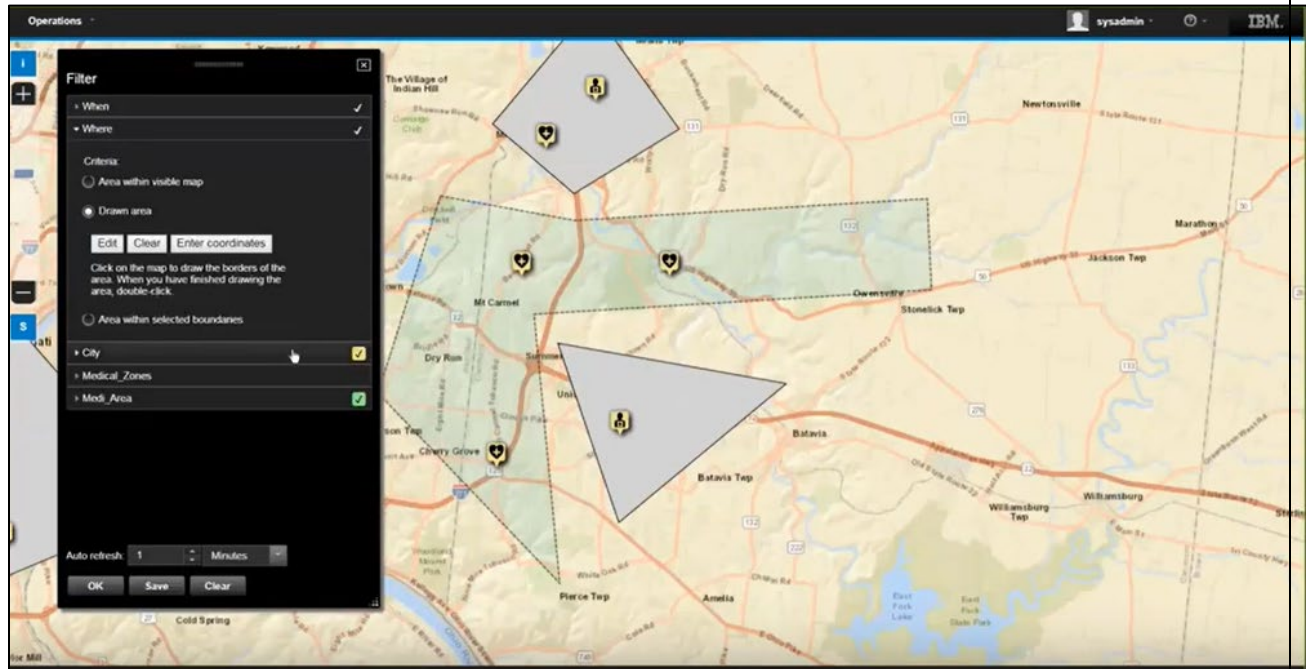
city personnel to make informed decisions by allowing them to interact with different types of conditions in a uniform manner.

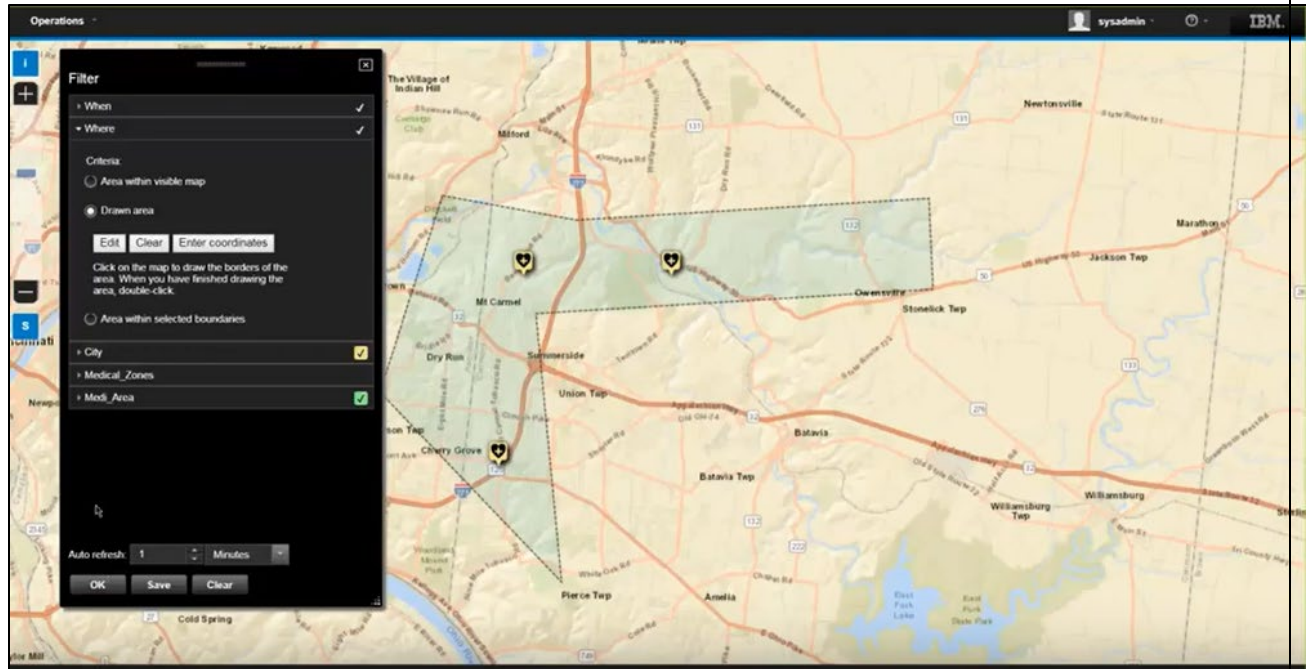
77. Specifically, personnel in a command center using IBM's IOC needed to focus on results in specifically shaped regions so as to observe of events in specific neighborhoods. To respond to these events, they needed to be able to update the results after visualizing geospatial information, analyzing the information, and deselecting irrelevant results. But if a person's desired geographical search area did not neatly conform to the designated square the map was displayed in, they were presented with many irrelevant results, which could lead to frustration or wasted resources. Particularly, if only a subset of search results were displayed on the map at a time, a user would have to review every result to ensure they did not miss relevant results. Using the prior methods of searching and filtering, a user would be forced to sort through results that did not fit their search criteria, but were automatically returned because they fit within the map's dimensions on the screen. In contrast, the '789 patent allowed a user to designate their own area of the map to search and to select all of the results within that area for display to the user.

78. The inventors of the '789 patent achieved this innovative method of searching by allowing for greater interactivity and the ability to select a customized area of the map display in order to update the selection in both the map and list. Specifically, the inventors of the '789 patent realized that a user could get more relevant search results if they were able to use input/output devices to "draw 720 a selection area 400 in the viewing area 118 of the map display" using a user-determined shape. '789 patent at 6:48-52; claim 8. The search results displayed on the map were then filtered by "select[ing] elements 120 within the selection area 400" and "deselect[ing]" "[e]lements 120 outside the selection area" according to the user-determined selection area, giving users the ability to deselect the elements they were not interested in. *Id.* at 6:51-53. This functionality was accomplished by the inventors of the '789 patent using an approach to filtering based on deselection. Unlike highlighting an item on a map or highlighting a list item, which only

emphasized wanted results, the approach of the '789 patent deemphasized unwanted results by deselecting elements outside of the user drawn selection area.

79. Further, by “synchroniz[ing] 710 the map display 116 and the list display 124 to concurrently update the elements 120” so “that the changes are shown in both displays concurrently” a user was presented with detailed information about the points of interest in the user-designated area. *Id.* at 6:33-40. The invention was incorporated into IBM’s IOC and used by personnel in command centers to aid their decision-making by allowing them to more finely filter their results and hone in on the most relevant information.





Ex. 35 (From <https://www.youtube.com/watch?v=x3iHUNBkTDQ> at 00:56 and 00:58).

80. Before the invention of the '789 patent, personnel using IBM's IOC would have to rely on long-range predictions for trends and directions. Now, they can view real-time information on critical infrastructure and assets, such as medical facilities, public transportation, fire hydrants, and water treatment plants. The inventions of the '789 patent were successfully integrated into IBM's IOC and played an integral role in the success of this product. The novel technologies of the '789 patent greatly improved upon the prior art by allowing for multiple linked selection and filtering capabilities in the displays and bidirectional interaction between the list and map displays, regardless of the users' experience with different operating systems. This allowed users to more finely filter their search criteria and obtain more relevant results than prior art methods. The inventions of the '789 patent thus allow personnel to more effectively respond to events and to monitor assets and infrastructure using the claimed invention to deemphasize excess information.

81. The claims of the '789 patent have been recognized for its benefits and innovation through IBM IOC, which embodies the claims of the '789 patent. For example, a local official recognized that the city of South Bend, Indiana has had "huge measureable benefits" from "viewing

all our aggregated data in real-time” by using IBM IOC as part of its water management system.¹³ IBM IOC improved South Bend’s ability to predict the potential overflow of hazardous wastewater, and helped the city avoid more than \$600,000 in potential government fines. To illustrate, when a water utility specialist is flushing water hydrants to release iron or rust in South Bend, they can use the IOC’s dashboard to monitor the combined sewer pipes and make adjustments as needed to avoid a dry weather overflow violation. IBM IOC allowed South Bend to more quickly address and prevent issues such as sewer overflows, flooding, and water quality, leading a local official to state “we can ... solve problems, that, until now, seemed insurmountable.”¹⁴ For another example, IBM IOC allowed traffic management professionals at the New Jersey Turnpike Authority to minimize congestion and improve traffic flow. Professionals at the New Jersey Turnpike used IOC to access a centralized command and control system, which enabled them to respond to real-time information about roadway conditions from thousands of sensors.¹⁵

82. Zillow touts the “Draw Your Own Search” feature on the Zillow website and mobile applications as a technological innovation, despite the fact that appropriates the inventions of the ’789 patent. According to Zillow, the “Draw Your Own Search” feature was developed during Hack Week,¹⁶ which Zillow touts as a “whirlwind of ideation, experimentation, [and] new projects” that “provides employees with an opportunity to be creative” and to “work on projects that innovate on our tools, products, and processes.”¹⁷ Zillow also publicized that Hack Week “gives engineers time to ... help[] ensure [that] Zillow is using the best tools and technologies.”¹⁸ Zillow’s employees have recognized the benefits and innovation of the claims of the ’789 patent. The “Draw Your Own

¹³ Ex. 80 (<https://newsroom.ibm.com/2012-06-27-IBM-Notre-Dame-Emnet-Help-South-Bend-Indiana-Protect-Public-Health-Reduce-Pollution-with-Smarter-Cities-Cloud-Analytics>) at 1.

¹⁴ *Id.*

¹⁵ Ex. 81 (<https://www-03.ibm.com/press/us/en/pressrelease/46962.wss>) at 1.

¹⁶ Ex. 82 (<https://www.zillowgroup.com/news/winter-hack-week/>) at 1.

¹⁷ Ex. 83 (<https://medium.com/zillow-tech-hub/zillow-hack-week-summer-2019-686dd2ecab18>) at 1.

¹⁸ Ex. 82 at 1.

1 Search” feature was awarded by a panel of Zillow judges as one of the winners of Hack Week.¹⁹
2 Zillow advertises the “Draw Your Own Search” feature as “allow[ing] users to quickly and easily
3 draw the area they want to search on a map.”²⁰

4 83. In sum, the ’789 patent solves the problem of how to efficiently present geospatial
5 information on electronic device displays. It does so in a specific way: by providing an improved
6 graphical user interface displaying objects on a map and an associated list, and enabling users to
7 interact with and manipulate the display of these objects by drawing a free-form shape around
8 specific objects.

9 84. The invention of the ’789 patent is not the only possible solutions to the need for
10 effectively presenting and manipulating data with geospatial characteristics on electronic device
11 displays. Alternatives existed as well, but lack some of the advantages of the invention. For
12 example, one approach is a list-driven process, where the system could first define what information
13 is in the list display and then update the map display in response to the selection in the list display.
14 But the list display does not allow users to visualize the geospatial characteristics of information in
15 the decision-making process. Consequently, technology using this approach limited how users could
16 interact with geospatial data. There are also alternatives to using a selection area in a user drawn
17 shape. For example, it was known that items could be selected by dragging a rectangular region
18 over a set of items. For another example, items can be selected with a specified particular criteria
19 for selection, inclusion, or exclusion through the use of query language. But these approaches did
20 not address the need for users, such as personnel in command centers, to take into account the non-
21 linearity of particular areas, such as irregularly shaped neighborhoods, or geospatial features like
22 rivers, water hydrants, and roads.²¹

23 ¹⁹ Ex. 84 (<https://www.zillow.com/tech/hack-week-3/>) at 5.

24 ²⁰ Ex. 82 at 1.

25 ²¹ For a more detailed discussion regarding the problems of visualizing and understanding large sets
of data on a computer display prior to the ’789 patent, solutions to those problems, and inventive
aspects related to the ’789 patent, *see* Ex. 85 (Declaration of Andrew Cockburn).

H. IBM Invented Methods To Better Track Desperate Objects On Graphical User Interfaces By Using Dynamic Layers To Simultaneously Display Multiple Object Categories And Rearranging Those Layers In Response To User Requests.

85. At the time of the inventions of the '389 patent, the capabilities of computing devices and networking equipment were being improved and developed at a rapid rate. At the same time, systems that took advantage of these improvements were being implemented in all areas of industry. These improved systems were often much more complex than their predecessors due to the implementation of these new technologies. Examples of such complex systems include the inventory of a company or store, the hardware and software components of large organizations, and the employees of large municipalities. Although these complex systems could hold more data than past simpler systems, the large amount of data in these systems meant that it was more complicated to track and manage the operations of the system. In order to effectively oversee these systems, users needed to be able to tell how each component functions in the system as a whole, how each component is interrelated with other components, and how to holistically understand and visualize the entire architecture of the system. A need to better monitor these systems arose.

86. The inventors of the '389 patent developed the patented technologies as part of IBM's efforts to improve technology for displaying information and objects in complex systems using a graphical user interface. Due to the increasing complexity of the systems being developed, various methods were used to improve visualization of the components of such systems. At the time of the invention, data systems had fewer components, and thus visualization of the components based on spatial positioning was sufficient. For example, U.S. Patent No. 5,500,934 (Ex. 36), filed in 1994, discloses displaying objects of a LAN network by positioning the objects in defined locations. For another example, U.S. Patent No. 6,005,578 (Ex. 37), filed in 1997, discloses grouping objects into levels. Though such methods were adequate in those earlier years, by 2001, as systems continued to grow in complexity and the number of objects comprising such systems increased, the use of these methods became problematic. The volume of information and components of these new systems made it difficult to organize and present information on a computer's two dimensional screen using

1 existing methods in a way that was both comprehensive and understandable. In particular, using
2 such methods to display all of the information or components at once resulted in an overly cluttered
3 display with various objects overlapping each other. This made it difficult, if not impossible, to
4 determine the relevant details of and relationships between the information that a user was attempting
5 to view.

6 87. Additionally, complex systems also started to be comprised of more categories of
7 objects. As an example, an organization can be comprised of several computing devices, such as
8 personal computers and servers, various peripheral devices, such as printers and routers, and various
9 types of software, such as application software and middleware software. A user managing such a
10 system needed to be able to identify and view these various categories of objects to understand how
11 the various parts of the system interact together to diagnose any issues or deficiencies that may be
12 present. However, the cluttering and overlapping of objects in existing methods for displaying such
13 information made it impossible to decipher the relationships between the various pieces of
14 information and components. Moreover, the computer systems were unable to independently
15 determine the categories and apply the differences. Thus, there was a need in the prior art to be able
16 to display, on a two dimensional computer screen, a large amount of information in a manner that
17 allowed a user to seamlessly distinguish and navigate between various groups of related information
18 so that users can effectively monitor and manage their system.

19 88. The IBM Tivoli team recognized the difficulties businesses dealt with in trying to
20 monitor and manage their business systems due to the increasing level of complexity and the
21 increasing number of resources comprising the systems. The Tivoli team thus sought to develop the
22 Tivoli Global Enterprise Manager (“GEM”) in order to provide their business clients with an all-
23 inclusive solution for managing all aspects of their clients’ business environment. The most
24 pertinent problem identified by the Tivoli team was the users’ inability to understand their business
25 system as a whole. Because of the vast number of resources and interdependencies between such
resources, businesses needed a solution to be able to distinguish between each of these various

1 resources and to be able to easily comprehend how these resources interact. The inventions of the
2 '389 patent resolve these problems by disclosing a method that allows for effective monitoring of
3 the objects of the system even where the display of the objects are clustered and overlapping one
4 another by grouping objects of a category into layers, applying non-spatially distinguishable display
5 attributes to the objects of these layers, and applying a display emphasis on prioritized layers.
6 Though the solution was ultimately not included in the commercialized version of the GEM due to
7 the timing of the development of this feature, the inventors foresaw that the need for the inventions
8 of the '389 patent existed at the time of the invention and would continue to exist from that point
9 forward due to the inevitably increasing complexities of all systems.

10 89. Prior art methods grouped objects without effectively distinguishing groups of
11 objects in a useful way. The inventors of the '389 patent, noting that using prior art methods on
12 these complex systems would lead to an incomprehensible display of overlapping and cluttered
13 objects, developed an innovative method that accounts for the cluttered display by “using non-
14 spatially distinguishable display attributes, such as color hues, color values, color saturation, size,
15 three dimensional images, animation, shading, fill patterns, line patterns, line weights, opaqueness,
16 transparency, shape, and shape anomaly.” '389 patent at 6:7-10. The use of such attributes allows
17 a user to still see the groupings of objects that the user desires even when they are cluttered with
18 other objects by visually distinguishing these objects. *See id.* at 4:17-22. Figure 1. Thus, for
19 example, if a red hue is applied to the objects of the layer, the “color (hue) can be used to distinguish
20 one layer from another” even where there are thousands of other objects on display. *Id.* at 5:23-26.
21 Additionally, the patent discloses a method allowing a user to rearrange the various layers to allow
22 the user to effectively monitor their system with different points of view. In particular, the patent
23 explains that “[t]he user can re-layer the categories so that the category of objects displayed in one
24 layer are moved to another layer.” *Id.* at 2:61-63. For example, in a hotel inventory management
25 system, the user may want to view layers of hotels based on their star rating. If the user then elects
to view layers of hotels based on their location, the patent discloses a method wherein the hotels are

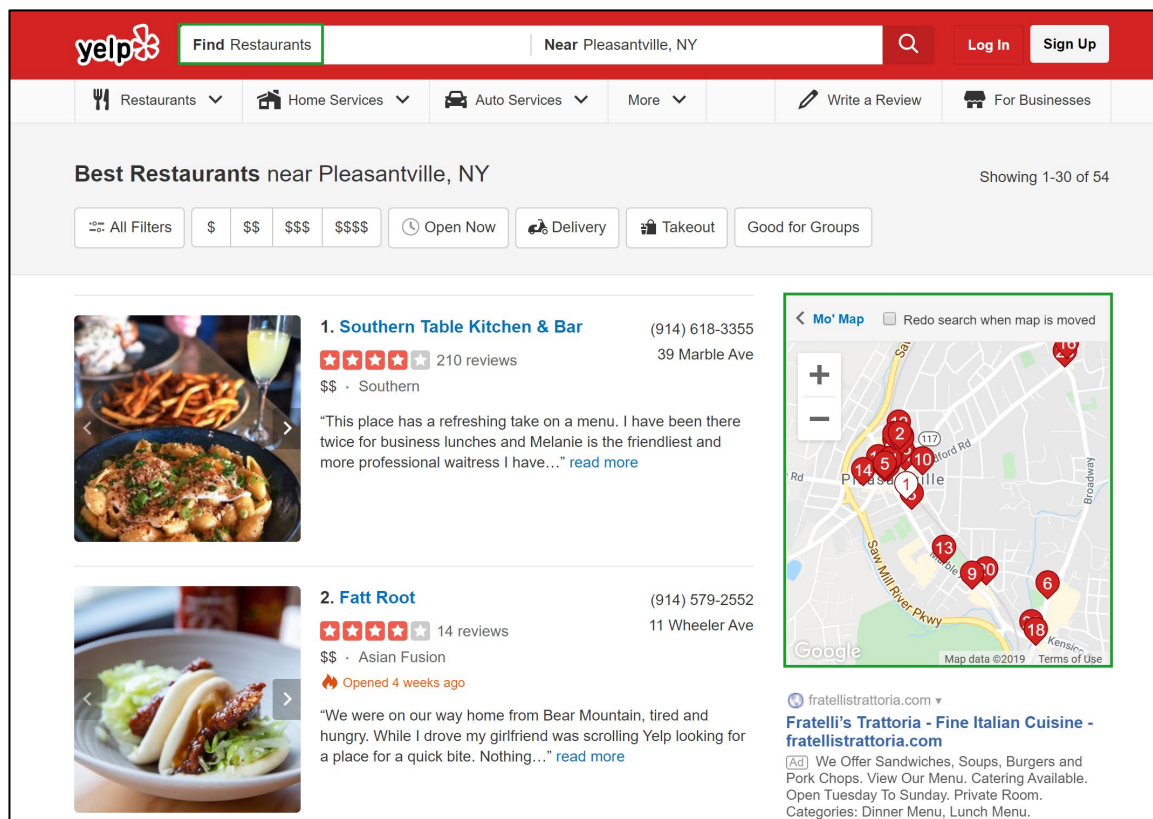
1 re-matched to a different layer based on location, and a different non-spatially distinguishable
2 display attribute is then applied to the hotels of each of these new layers.

3 90. The methods in existence at the time of the invention also did not include the
4 implementation of applying a display emphasis to visually distinguish between layers in the way
5 claimed by the inventors. Because systems had fewer objects when the prior art methods were
6 developed, there was no need to distinguish between layers. It was sufficient to group together the
7 objects and allow a user to navigate between these groups. However, as the number of objects in a
8 system increased, merely navigating between spatially-separated groups of objects was insufficient
9 for focusing on one group over another because of insufficient space on a screen to allow for a
10 feasible display of these groups. Therefore, not only did the inventors introduce the use of non-
11 spatially distinguishable display attributes to represent various layers, the inventors also disclosed
12 the implementation of a display emphasis between layers so that users could readily focus on a
13 specific layer. The patent explains that “one view can display the category of hardware objects in a
14 first, or most emphasized layer and a display of the category of software objects in a second, less
15 emphasized, layer.” *Id.* at 2:64-66. The application of a display emphasis allows one layer to be
16 emphasized over the other layers, such as by overlapping the focused layer over the others or by
17 saturating the color of that focused layer, so that the user can easily view the layer that is prioritized.
18 Additionally, the invention discloses reapplying the display emphasis when the layers are reordered.
19 *See id.* at 2:66-3:5. This allows the user to navigate between layers by emphasizing the newly
20 prioritized layer over the other layers. The addition of a display emphasis thus enables users to view
the layers in a particular order.

21 91. In sum, the ’389 patent solves the problem of how to visualize a complex dataset
22 where there are too many objects to clearly display at the same time on a computer screen. It does
23 so in a specific way: by organizing those objects based on like characteristics and distributing them
24 into distinct adaptable layers, such that objects are visually distinguished not based on where they
25 appear but based on the layer in which they appear, thus allowing user to better understand cross

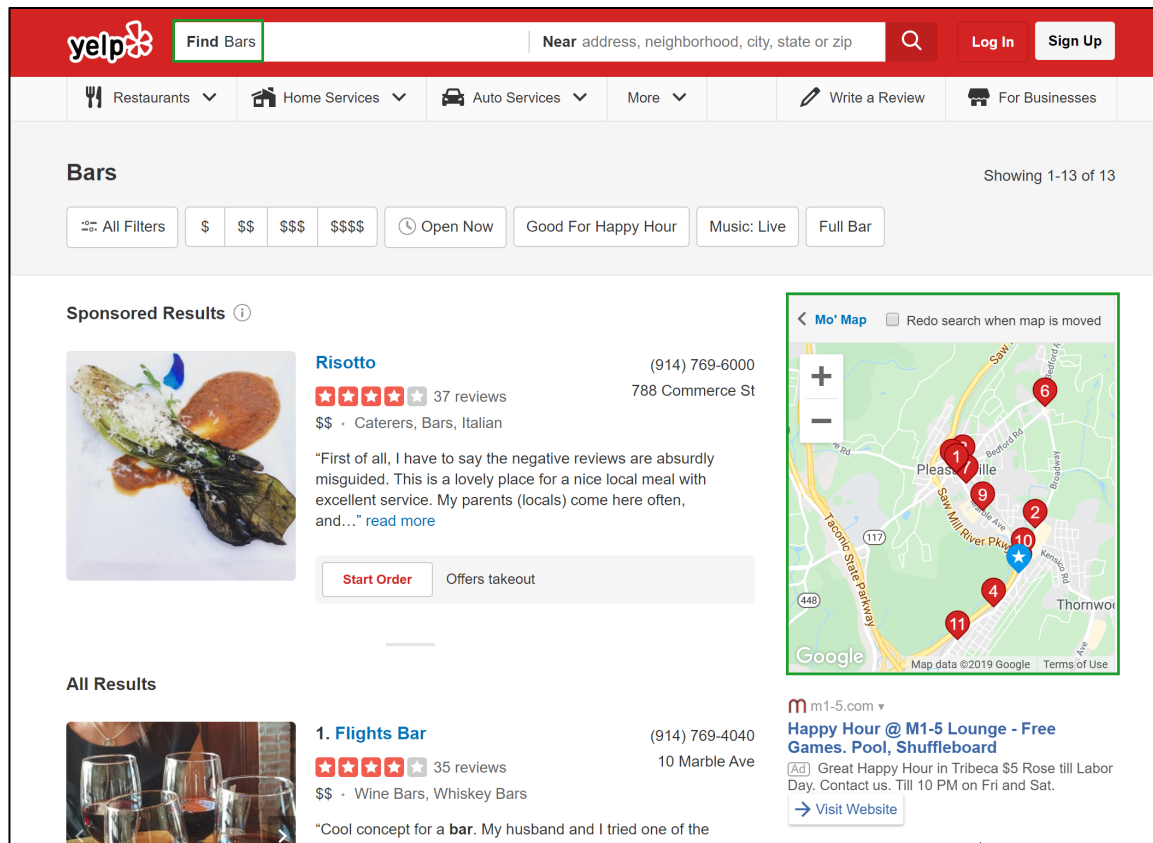
sections of the data or re-arrange the layers to further explore the dataset, without being overwhelmed by the sheer amount of relevant information.

92. The inventions of the '389 patent are not the only possible solution to the need for effective display of a large number of objects. Other solutions existed as well, but lack some of the advantages of the invention. For example, the display technology used by Yelp allows the user to select a single category of objects at a time and displays only the objects of that category on their map.



Ex. 38 ([https://www.yelp.com/search?](https://www.yelp.com/search?find_desc=Restaurants&find_loc=Pleasantville%2CNY)

[find_desc=Restaurants&find_loc=Pleasantville%2CNY](https://www.yelp.com/search?find_desc=Restaurants&find_loc=Pleasantville%2CNY)).



Ex. 39 ([https://www.yelp.com/search?](https://www.yelp.com/search?find_desc=Bars&find_loc=Pleasantville%2C%20NY)

[find_desc=Bars&find_loc=Pleasantville%2C%20NY](https://www.yelp.com/search?find_desc=Bars&find_loc=Pleasantville%2C%20NY)).

93. Though this method ultimately allows a user to view the objects within the inventory of Yelp by viewing each category separately, it fails to include the use of displaying layers wherein the objects of each layer are displayed using non-spatially distinguishable display attributes. The use of layers allows a user to see the various objects of the system at one time to provide the user with a better understanding of the various objects present in the system. In the case of Yelp, using the inventions of the '389 patent would provide a user a better understanding of the composition of establishments in the town and the total number of options that a user can consider to plan out the user's itinerary.

94. Another alternative solution was invented by Robert Uthe, one of the co-inventors of the '389 patent, and disclosed in U.S. Patent No. 10,250,454 (Ex. 40, "the '454 patent"). The '454

1 patent teaches grouping all the objects with a selected attribute into a single subgroup represented
 2 by a display element shown on the computer screen. The user can select this display element to view
 3 information common to all the objects of that subgroup. Although the '454 patent does teach a
 4 particular solution for displaying the numerous components of a system, the '389 patent's invention
 5 includes additional advantages. In particular, the use of layers allows a user to visually understand
 6 the number of components each layer is comprised of and also allows a user to select a specific
 7 object of a layer as opposed to having to select the entire set of objects.²²

8 **I. IBM Invented Unconventional Methods For Targeting Users With Highly Relevant**
 9 **Advertising By Leveraging The Characteristics Of Search Results Rather Than**
 10 **Merely Matching Search Queries.**

11 95. The inventors of the '443 patent developed the patented technologies as part of IBM's
 12 efforts to improve Internet search engine technology in the area of e-commerce solutions and, in
 13 particular, targeted advertisements. Prior to the inventions of the '443 patent, with the accelerated
 14 growth of the Internet and its associated e-commerce activities, advertising over the Internet became
 15 increasingly more acceptable to Internet users, and marketing professionals looked for ways to
 16 optimize online advertising. But the technology used to deliver targeted advertisements to Internet
 17 users presented unique challenges—different from those faced by offline advertising (such as
 18 person-to-person marketing)—because computers must determine appropriate ads based largely on
 the users' behaviors while browsing the Internet.

19 96. One prior art solution to the challenges faced by internet advertisers involved building
 20 user profiles with cookies to generate banners ads. Internet advertisers built a user profile by
 21 extracting data about the user from the user's browsing behaviors. When the user browsed a
 22 particular website, the website placed on the user's computer a small piece of data (a "cookie") from
 23 the user's browsing session on that website. When the user returned to that website, the website

24 ²² For a more detailed discussion regarding the problems of visualizing and understanding large sets
 25 of data on a computer display prior to the '389 patent, solutions to those problems, and inventive
 aspects related to the '389 patent, *see* Ex. 85 (Declaration of Andrew Cockburn).

retrieved the cookies associated with that user to determine the user's interests. These cookies comprised the user's "user profile"—a snapshot of the user's interests derived from their browsing behaviors. For example, a user might visit the website www.sears.com looking for a dishwasher. The website stored a cookie on the user's computer indicating that the user is interested in dishwashers. If the user later returned to www.sears.com, the website retrieved the cookie from the user's computer and determined that the user was interested in dishwashers.

97. At the time of the invention of the '443 patent, advertisers typically used cookies to build user profiles. The advertisers then used those user profiles to generate banner ads. Banner ads are advertisements embedded into a website, typically appearing on a site as a bar, column, or box. An early banner ad is seen in the image below:



Ex. 41 (<https://www.theatlantic.com/technology/archive/2017/04/the-first-ever-banner-ad-on-the-web/523728/>).

98. Advertisers presented banner ads according to the user's user profile, on the assumption that the user profile accurately represented the user's interests. For example, a user might have a user profile indicating that they are interested in dishwashers. When the user visited www.sears.com, the website detected this attribute in the user's user profile and presented a banner ad on the website advertising dishwashers.

99. Although user profiling and banner ads were a popular form of internet advertising at the time of the invention of the '443 patent, they suffered from numerous drawbacks. A website displayed banner ads to a user whether or not the user solicited them, which annoyed users who did not want to see any ads or who preferred to view ads only if the user requested them. User profiling was also burdensome and time-consuming to carry-out, especially for website owners who were not

1 tech savvy or lacked the required resources. Moreover, user profiling and banner ads were typically
2 only effective on websites that had high user traffic, since building comprehensive and informative
3 user profiles required extensive interactions with the website from lots of users.

4 100. Additionally, user profiling and banner ads were often not aligned with the user's
5 actual interests. For example, a user might visit www.sears.com and search for a dishwasher. The
6 website stored a cookie indicating that the user is interested in dishwashers. The user then left the
7 website and purchased a dishwasher in-person from a different store. When the user returned to
8 www.sears.com in search of an air conditioner, the website retrieved the user's cookie and
9 mistakenly concluded that the user is still interested in a dishwasher. Advertisers therefore had
10 difficulty keeping user profiles and banner ads aligned to a user's current interests. User profiling
11 and banner ads also failed to account for offline purchases and untracked online purchases. For
12 example, the website could not determine if a user bought a particular product in-person at a store,
13 disabled cookies on their browser before making a purchase, or simply chose to browse
14 anonymously.

15 101. The inventors of the '443 patent developed a novel and unconventional approach to
16 delivering advertisements over the Internet that overcame the limitations of user profiling and banner
17 advertisements. The inventors' core philosophy was at odds with the banner advertisements that
18 were prevalent at the time of the invention of the '443 patent. The '443 patent explains that "unlike
19 the prior art methods of selecting and displaying banner ads predicated on user profiles, these profiles
20 need not be relied upon. Instead the initial search results themselves are utilized." '443 patent at
21 5:16-19. The patent goes on to state that "[t]he invention's philosophy relies on the principle that
22 users who are performing a search query have a special interest in finding a particular piece of
23 information. From this one may deduce that if a user is interested in a specific piece of information,
24 he or she may be interested in related or similar advertisements." *Id.* at 5:11-16. The patent describes
25 the patented invention as "a new method and apparatus for associating search result items with

1 similar or related advertisements.” *Id.* at 2:63-65. The core idea behind the ’443 patent was therefore
2 an unconventional departure from the conventional internet advertising techniques of user profiling
3 and banner advertisements.

4 102. The patent describes the unconventional technique of generating internet
5 advertisements based off the results of a user search. First, a user performs a search. If the search
6 returns a search result, the system performs a search for related advertisements using that search
7 result. For example, a user may search “washer machine” and get three search results, named
8 WashMax, CleanMaster, and HousePro. The system could use the information contained in the
9 “WashMax” search result to search for advertisements related to that particular search result. The
10 system could repeat the advertisement search for both the CleanMaster and HousePro search results.

11 103. The system can also place a Graphical User Interface (“GUI”) button next to each
12 search result. If the user clicks a search result, the system returns information for that search result.
13 On the other hand, if the user selects the GUI button next to the search result, the system initiates a
14 search of the advertised database using the search result as a search parameter, and displays to the
15 user advertisements relating to that search result.

16 104. The ’443 patent describes a detailed algorithm for performing this unconventional
17 method of delivering internet advertisements based on search result items in a computing
18 environment. First, a “user initially submits a query” which is then “forwarded to the user/session
19 manager subsystem [] which then forwards it on to [the] search engine.” *Id.* at 6:27-31. The “search
20 engine [] performs an Internet search and produces a search results set” which is then “forwarded []
21 to the product matching manager.” *Id.* at 6:31-34. “The product matching manager [] takes the
22 search engine results set and attempts to match at least one product to each of the search result items”
23 by “communicat[ing] with the product database.” *Id.* at 6:35-38. Then, “[f]or each match found,
24 the product matching manager [] flags the corresponding search result item” and “this flag is used
25 by the request server . . . to display a graphical user interface [‘GUI’] designator.” *Id.* at 6:49-54.

1 After that, “[t]he request server [] builds a results page which contains the search result items, and if
2 the search result item was flagged as [] having a product match, a [] graphical user interface [‘GUI’]
3 designator is also displayed for subsequent user selection. The search result items and associated
4 product icons are then displayed [] to the browser.” *Id.* at 7:11-17.

5 105. The ’443 patent also describes how the computer-specific process of caching is used
6 to implement in an inventive way the unconventional method of delivering associated
7 advertisements based on search result items. The ’443 patent states that a “caching component []
8 may be used to expedite the matching process.” *Id.* at 6:44-45. The ’443 patent further explains that
9 “[t]his additional caching component stores frequent advertising queries, using the URL of the
10 search result item as a unique key identifier.” 6:47-49. The patent recognizes that a computer has
11 limited time and resources to retrieve information, and presents an unconventional method of using
12 caching to search for advertisements using the search result items in a time and resource-efficient
13 manner. The patent explains that “performance of the implementation is time sensitive”, and
14 therefore “the complete product list is not associated with each search result item [immediately],”
15 but instead “[t]he caching component may be adapted to yield a TRUE or FALSE designation to the
16 user depending on whether related advertisements exist for the URL of a particular search result
17 item.” *Id.* at 6:54-60. The ’443 patent goes on to explain that “[e]very result for an advertisement
18 is stored in the caching component. Advertising queries issued from the product matching manager
19 [] perform a first inquiry in the caching component database, and then a full advertising query if no
20 information is found in the caching component database for the particular search result item.” *Id.* at
21 6:60-65. The invention therefore applies caching in an inventive way to improve the delivery of
22 advertisements over the internet within a computer context.

23 106. The ’443 patent also describes how the invention uses the computer-specific
24 technique of “batch processing” in an inventive way to implement the unconventional method of
25 delivering advertisements related to search result items over the Internet. The patent explains that

1 “the product matching manager [] may be adapted to perform an off-line batch process for each
2 search result item in the search engine repository. The product database [] and the search engine
3 repository are synchronized for this alternative approach. For example, for any new product
4 advertisements, the product matching manager would update the cache.” *Id.* at 6:66-7:5. The
5 invention therefore applies batch processing in an inventive way to improve the delivery of
6 advertisements over the internet within a computer context.

7 107. The ’443 patent further describes how the unconventional method of delivering
8 advertisements associated with search result items improves internet advertising. The patent states
9 that “the implementation of this methodology will establish a new avenue for generating revenue
10 from Internet advertisements.” *Id.* at 1:65-67. Unlike user profiling and banner advertisements,
11 generating advertisements based on the search result items themselves gives any website—no matter
12 how small or infrequently visited—the ability to generate advertisements and ad revenue as long as
13 the website has some type of search engine. As the ’443 patent states: “[U]nlike the current user
14 profiling methods, all web site owners who provide search engine services will be able [to] make
15 use of the instant invention, independent of whether user profiling information can be obtained.” *Id.*
16 at 2:1-4.

17 108. The invention also more closely aligns the advertisements with the user’s interests,
18 since unlike user profiles, “search results provide a more narrowly defined basis for selecting target
19 advertisements for each user.” *Id.* at 5:20-21. Internet advertisers no longer have to rely on
20 potentially outdated user profiles to generate unsolicited banner ads that may not even reflect the
21 interests of the user. Instead, internet advertisers can use the unconventional methods of the ’443
22 patent to find relevant advertisements for a particular user by using search result items returned to
23 the user through a user-initiated search. Therefore, the systems and methods of the ’443 patent are
24 novel and unconventional.

J. IBM Invented Methods For Improving Computer-Generated Promotions By Creating Special-Purpose Promotion Templates And Instances That Could Be Modified, Combined, And Filtered To Achieve Highly Tailored Promotion Campaigns.

109. The inventors of the '904 patent developed the patented technologies to improve how promotions were generated and how they were subsequently managed, organized, and distributed. At the time of the inventions of the '904 patent, increases in computer power and network speeds increased the number and complexity of online advertising. Marketers became increasingly interested in personalized advertising because such advertising had a higher conversion rate—the rate at which recipients would purchase products and services. At the same time, customers came to expect advertisements to be tailored to their particular interests and circumstances.

110. In the prior art, marketers used a top-down system in order to create and distribute promotions. Marketers would create a small number of standardized promotions and query a database for potential customers with particular attributes to find a group of targets who would receive the promotions. Marketers could modify basic information by completing fields in the standardized promotions, much like completing a form when going to the doctor's office. For example, marketers could use "mail merge" functionality to insert the customer's name, email, physical address, and other characteristics into preset fields on preexisting promotions. Using the mail merge technique, marketers could create the impression of personalized advertising—as long as the number of promotions remained manageable. Zillow relied on such a mail merge system in a PTAB petition it filed to challenge the patentability of the '904 patent.²³ That system differs from the claimed inventions in several important ways.²⁴

111. While the mail merge process was sufficient for basic marketing purposes, it created challenges for generating and keeping track of the various promotions and failed to offer valuable

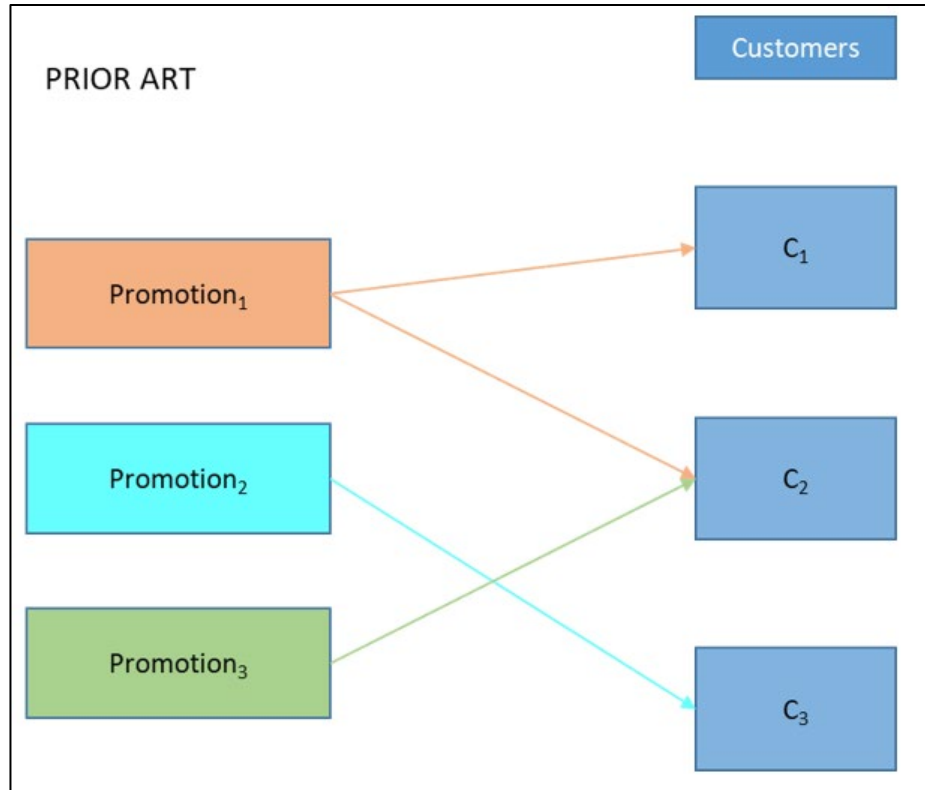
²³ See Ex. 86 (*Zillow Group, Inc. v. International Business Machines Corp.*, IPR2020-01656, Ex. 1003 (PTAB Sept. 18, 2020)) at [0098], [0567], Figure 1.

²⁴ See Ex. 87 (*Zillow Group, Inc. v. International Business Machines Corp.*, IPR2020-01656, Paper 006).

1 analytics for improving future marketing campaigns. As the marketers increasingly encountered
2 potential customers online, the number of potential promotions could reach into the thousands.
3 Individually creating each promotion was time consuming and resource intensive. Further,
4 marketers could not use the simple mail merge process of combining text or graphics to create highly
5 personalized promotions. Therefore, marketers had to settle for sending very similar promotions to
6 large groups of targets. Not only would this hurt the relevancy of the promotion to each target, it
7 was also possible that the information would be outdated by the time the promotion had been created
8 and delivered.

9 112. Finding the appropriate promotions, organizing them, and getting those promotions
10 to the right customers presented another problem. If marketers sent a promotion to small target
11 groups, it was difficult to track the effectiveness of the promotion over a meaningful number of
12 potential customers. If marketers sent a promotion to large target groups, it was difficult to create
13 highly personalized promotions. Therefore a need arose to create promotions efficiently, while
14 grouping related promotions together so they could then be provided to a larger number of customers.

15 113. As illustrated below, promotions in the prior art were distributed by first being
16 generated by a user, after which the promotion was sent to a customer or customers deemed to be
17 part of the relevant customer base for each respective promotion. In this one-way process of
18 distributing promotions, information was only received from the consumers after the promotions
19 were already sent.



13 114. The inventors of the '904 patent addressed those needs using a new method of

14 creating and distributing promotions that utilized a bottom-up strategy, in contrast to the top-down

15 style of the prior art. This invention leveraged unconventional promotion templates that could

16 dynamically create individual promotions and individual promotion lists. Using the claimed

17 promotion templates, the inventors were able to create collections of promotion instances and

18 promotion versions. These collections, called promotion lists, could be distributed to customers and

19 used, for example, as individualized promotion campaigns. To achieve this result, the inventors

20 designed promotion templates that could repeatedly produce other promotion templates, promotion

21 instances, or promotion versions based upon specific parameters determined by the user of the

22 marketing system. Users could more easily store, manipulate, and distribute the promotions by

23 creating a promotion list populated by relevant promotions, generated through the use of one or more

24 promotion templates.

25

115. Promotion templates are able to create replicable promotions because they may include both preassigned attributes, which will define the resulting promotion and are likely to be used across templates, and custom attributes, which may be unique to a specific template or group of templates. The latter can be implemented using parameterized fields for which users can change the values. For example, if a user wants to generate promotions for specific flights, the attribute fields “FavoriteTrips.From” and “FavoriteTrips.To” could be populated with the values “Boston” and “New York,” respectively, for a customer interested in traveling between those two cities. In this way a user can now generate countless promotion instances or versions which advertise the price of trips from Boston to New York for different dates and different price-points all produced by the same template. If another customer often travels between Atlanta to San Diego, this same template could generate promotions to advertise flights on this route to that specific customer. Thus, a single flights-specific template can be repeatedly used in different scenarios. This made it possible for the first time to create a massive promotion database, which could be easily queried and sent to potential customers.

116. Further, the innovative methods of the ’904 patent allowed those promotions to be further individualized in specific promotion lists responsive to the user’s search query. Following from the previous example, a customer who is traveling from Boston to New York might be shown a promotion list that includes promotions for hotels in New York, promotions for activities in New York, as well as promotions for flights from Boston to New York, all created from different promotion templates.

117. The creation of promotion instances from a promotion template is only one of the inventive aspect of the claimed invention. The ’904 patent also drastically changed how the promotions that had been created were then *distributed*. For example, the inventors claimed an algorithm comprising a series of steps that allows for flexibility *after* promotion instances have been generated. Those steps addressed the need for finding and delivering appropriate and relevant

1 promotions from a large number of promotion instances that may have been generated from
2 promotion templates. The inventors of the '904 patent also recognized that the same target customer
3 may need to receive multiple promotion instances. By leveraging information about a target
4 recipient, such as using a search query that the recipient itself had generated, a collection of highly
5 relevant promotion instances could be delivered to increase the effectiveness of the marketing
6 campaign.

7 118. **First**, to offer a customized high-level “filtering” of the promotion instances which
8 were previously generated by a promotion template, the inventors conceived of a system that
9 received “a search query that includes one or more attributes of a promotion instance.” '904 patent
10 at 24:54-55. For instance, a user could submit a search query utilizing Boolean operators to limit
11 the results to exactly what that user was looking for. *Id.* at 16:66-17:12 (“The ‘AND’ is an example
12 of using a search term that is a Boolean operator to cause the process to include both ‘rkennedy’ and
13 ‘Email’ as search criteria 374.”). By leveraging these highly specific attributes in the search query,
14 the invention enabled searching for promotion instances that would reflect the interest of the target
15 recipient and in response, return a list of highly relevant promotion instances.

16 119. **Second**, once the search query is received, the inventions include “searching one or
17 more data repositories for promotion instances having attributes corresponding to the attributes
18 specified in the search query.” *Id.* at Claim 1. This search identified promotion instances relevant
19 to the target recipient by searching for and, in a later step, returning a list of promotion instances that
20 have similar attributes to the search query. Because promotion instances are being searched for and
21 narrowed based on a user query, as opposed to being sent out across an entire field of potential
22 targets, the potential customers receive more tailored promotions and marketers get more accurate
23 results and feedback.

24 120. **Third**, the inventors of the '904 patent further recognized that additional “filtering,”
25 such as filtering out promotion instances that a user may not want to view or that are outdated, can

1 be carried out to select an even more relevant collection of promotion instances for delivery to the
2 target recipient. Specifically, the '904 patent teaches "receiving, by the one or more computers, a
3 selection of one or more promotion instances, from the returned list, to be included in the promotion
4 list." *Id.* at Claim 1. In other words, the inventors contemplated refining the list of promotion
5 instances matching the query to even more finely tailor the promotion instances delivered to the
6 target audience. *Id.* at 17:20-39 ("For example, suppose the user wishes to query all promotion
7 instances for gold credit cards, but only wants the promotion instance for the gold credit card with
8 the lowest interest rate. Thus, if the user sorts 378 results of promotion instances for gold credit
9 cards in ascending order by interest rate, and limits 380 the results to the first hit, then the user can
10 find, the promotion instance for a gold credit card with the lowest interest rate."), Figure 18. This
11 tailoring of promotion instances was a drastic departure from the prior art "wait and see" approach.
12 Rather than sending the same promotion to everyone in a target group and waiting to analyze
13 feedback on that promotion, promotions could be targeted based upon the user's search query, even
14 before the promotions have been distributed.

15 121. **Fourth**, the patented invention taught assigning this tailored set of promotion
16 instances to a "promotion list," which is a **collection** of one or more promotion instances that may
17 be delivered to the desired target recipient. *Id.* at 16:17-20 ("A promotion list is a collection of one
18 or more promotion instances and can be used where ever individual promotion instances are used.").
19 By utilizing promotion lists instead of sending out a singular promotion, the '904 patent allowed for
20 tailored collections of promotions to be sent to targets. This not only increased the analytical
21 possibilities by providing the ability to analyze each promotion in a collection, but it also increased
22 the possible number of relevant promotions that could be presented to a target at one time.

23 122. **Fifth**, the inventors conceived of promotion codes that could track target responses,
24 offering insight previously unavailable to marketers. By tracking each promotion instance with a
25 promotion code, the marketer could determine which specific promotion created a response from the

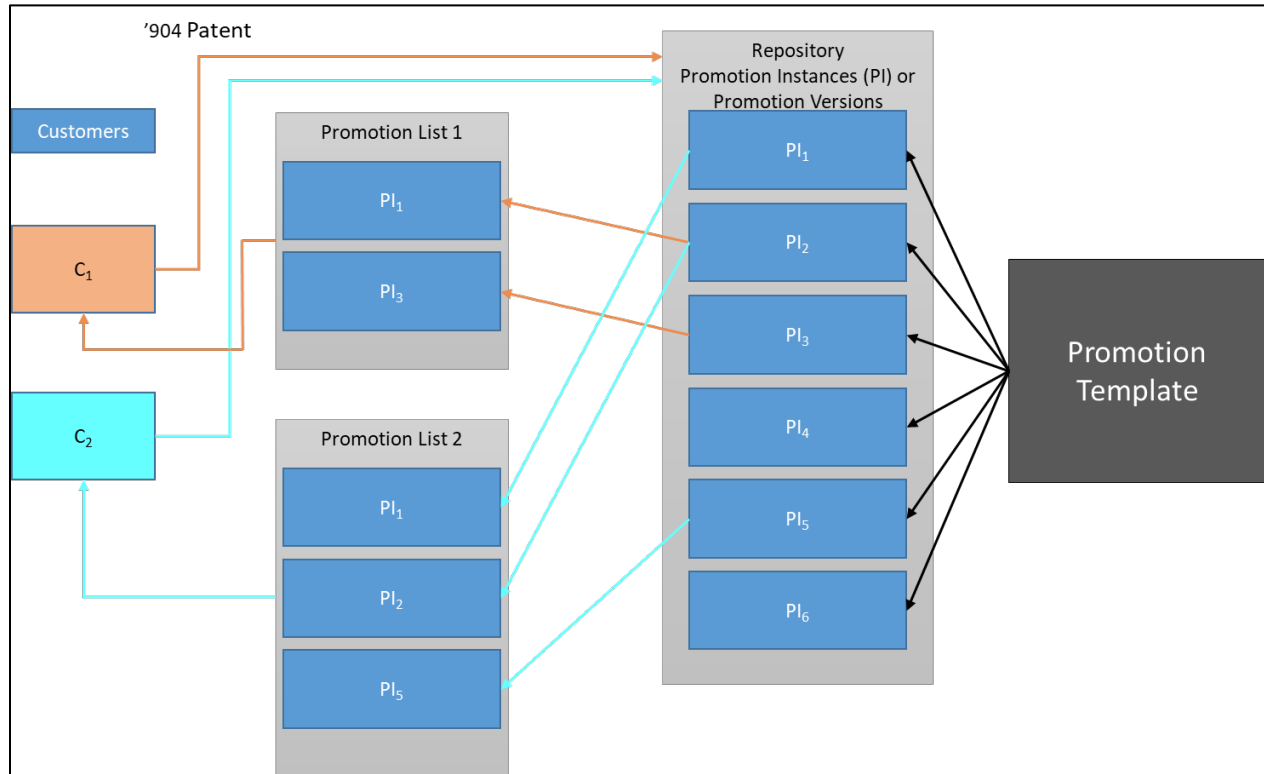
target, regardless of how many promotions that target received, and could therefore understand which promotions were most effective. Promotion codes allowed marketing campaigns to be more effective by enabling marketers to push the use of the most effective promotions. The subsequent promotion lists could then comprised of only the most efficient promotion instances. This process could iteratively run throughout the promotion management campaign, constantly creating promotion lists for targets with the most efficient and relevant promotions. The patented invention thus enabled marketers to receive feedback and analyze data while campaigns are running so they can better allocate resources and redirect the campaign if needed.²⁵ This added flexibility and allowed campaigns to be more agile, all while saving money and company resources and further allowed for automation of some of the analytics for increased efficiency and accuracy.²⁶ These improvements are made possible through the use of promotion templates generating promotion instances and the utilization of promotion codes.

123. All of these improvements over the prior art allowed for a more efficient and effective method of the creation and subsequent distribution of promotions. Compared to the “PRIOR ART” figure above, the figure below illustrates at a high level how the ability to generate a large repository of promotion instances combines with other inventive aspects of the ’904 patent to timely deliver relevant promotion instances. As discussed, these promotion instances can be assigned to promotion lists to distribute the most relevant promotions in the most efficient way possible to the targets. The inventors were thus able to generate a dynamic promotion list that could be updated, without user intervention, to reflect any changes in promotion instances by using a query that dynamically returned promotion instances that matched the query. By reversing the direction of the previously

²⁵ Ex. 88 (Colin Beasty, *Affinium 7: Unica’s Authoritative Solution*, destinationCRM.com (Sept. 14, 2006), <https://www.destinationcrm.com/Articles/CRM-News/CRM-Featured-Articles/Affinium-7-Unicas-Authoritative-Solution-42515.aspx>) at 2.

²⁶ Ex. 89 (*Unica(R) Rolls Out New Version of Its Enterprise Marketing Management Suite*, CRM Directory (September 15, 2006), <http://www.crmdirectory.com/unicar-rolls-out-new-version-of-its-enterprise-marketing-management-suite/>) at 2.

one-way analysis of marketing campaigns, the '904 patent greatly benefitted marketers and targets alike by allowing for massive improvements in promotion distribution.



K. Zillow Has Built Its Business By Infringing IBM's Patents.

124. Zillow provides customers with access to real estate listings and provides real estate agents with advertisements and other services. Zillow also purchases homes directly from customers that they repair and sell.²⁷ Zillow Group and its subsidiaries have grown rapidly over the last several years and now have over one billion dollars of annual revenue.²⁸

125. Rather than build their business on their own technologies, Zillow has appropriated the inventions of the Patents-in-Suit. The website, including at least www.zillow.com, www.zillowgroupmedia.com, and subdomains thereof, and the associated mobile applications,

²⁷ Ex. 7 (<https://www.zillow.com/offers/>) (describing the process by which Zillow purchases and then sells homes).

²⁸ Ex. 4 (Zillow Group 2018 10-K) at 42.

1 including at least the iOS and Android Zillow Real Estate & Rentals, Zillow Rentals, and Zillow
2 Premier Agent applications, under Zillow's control use the technology claimed by the Patents-in-
3 Suit to provide customers with access to real estate listings; provide Zillow's Business-to-Business
4 services, provide advertisements and other services for real estate agents, including through
5 Promoted Communities for new constructions, Zillow's Premier Agent service, and other properties
6 involving Zillow Group Media; and buy, service, advertise, and provide properties through Zillow
7 Offers. IBM has informed Zillow of its infringement, but Zillow continues to infringe despite the
8 knowledge of their infringement.

9 126. IBM has attempted to reach a patent licensing agreement to end Zillow's
10 unauthorized use of IBM's patents since at least June 2016. Since that time, IBM has sent Zillow
11 numerous letters concerning their infringement of the Patents-in-Suit. IBM has also met and held
12 telephone calls with representatives from Zillow to attempt to negotiate a license.

13 127. On August 11, 2017, IBM sent Zillow a letter informing them that they were
14 infringing several patents, including the '849 and '789 patents. On October 31, 2017, IBM further
15 informed Zillow that it was infringing the '346 patent. At a meeting between the parties on
16 November 13, 2017, IBM presented detailed claim charts demonstrating how Zillow was infringing
17 the '849, '789, and '346 patents, along with several others patents.

18 128. IBM informed Zillow that it was infringing the '183 and '389 patents on January 14,
19 2019. At that time, IBM also provided detailed claim charts demonstrating how Zillow was
20 infringing those patents. Then, on August 26, 2019, IBM informed Zillow that it was infringing the
21 '904 and '443 patents and again provided detailed claim charts demonstrating their infringement.
22 Finally, on November 25, 2019, IBM provided additional evidence of Zillow's infringement of the
23 '183 patent, including an additional detailed claim chart demonstrating this infringement.

24 129. IBM has repeatedly attempted to reach a negotiated solution to Zillow's infringement
25 of the Patents-in-Suit and has presented detailed examples of their infringement of each of the

1 Patents-in-Suit. But Zillow has refused to engage in any meaningful discussions about reaching a
 2 license agreement to end their infringement of IBM's patents. Instead, Zillow has continued to
 3 willfully infringe IBM's patents so as to obtain the significant benefits of IBM's innovations without
 4 paying any compensation to IBM.

5 130. Because IBM's over three-year struggle to negotiate a license agreement that
 6 remedies Zillow's unlawful conduct has failed, IBM has been forced to seek relief through litigation.
 7 Among other relief sought, IBM seeks royalties on the billions of dollars in revenue that Zillow has
 8 received based on their infringement of IBM's patented technology.

9 131. Zillow has challenged the patent eligibility of the patents in this action. However, all
 10 of the asserted claims recite technical solutions to technical problems and include unconventional
 11 inventive concepts, as confirmed by both parties' claim construction positions and the claims
 12 themselves.²⁹

13 **COUNT ONE**

14 **INFRINGEMENT OF THE '849 PATENT**

15 132. IBM incorporates by reference paragraphs 1-131.

16 133. IBM is the owner of all right, title and interest in the '849 patent. The '849 patent
 17 was duly and properly issued by the USPTO on July 4, 2006. The '849 patent was duly assigned to
 18 IBM. A copy of the '849 patent is attached hereto as Exhibit 42.

19 134. The '849 patent is valid and enforceable.

20 135. In violation of 35 U.S.C. § 271, Zillow has infringed, contributed to the infringement
 21 of, and/or induced others to infringe one or more of the claims of the '849 patent by having made,
 22 designed, offered for sale, sold, provided, used, maintained, and/or supported their website,
 23 including at least www.zillow.com, www.zillowgroupmedia.com, and subdomains thereof, and the

24 ²⁹ Ex. 90, 2020-05-19 IBM Rule 4-2 Exchange of Preliminary Claim Constructions; Ex. 91, 2020-
 25 05-19 Zillow Preliminary Claim Construction; Ex. 92, August 20, 2020 Joint Status Report (Dkt.
 No. 131); Ex. 93, Inventive Concept Chart.

1 associated mobile applications, including the Zillow applications for mobile devices running on, for
 2 example, the Apple iOS and Google Android operating systems, including at least Zillow Real Estate
 3 & Rentals, Zillow Rentals, and Zillow Premier Agent applications. Zillow's infringement is
 4 continuing.

5 136. Zillow Group "operates the largest portfolio of real estate and home-related brands
 6 on mobile and the web which focus on all stages of the home lifecycle: renting, buying, selling and
 7 financing. . . . The Zillow Group portfolio of consumer brands includes Zillow" ³⁰ Zillow
 8 Group's "technology solutions" and actions related to such technology infringe, direct or control
 9 infringement, induce infringement, and/or contribute to the infringement through Zillow's website
 10 and through the mobile application instrumentalities.

11 137. Zillow, Inc. owns and operates the Zillow website, including at least
 12 www.zillow.com, www.zillowgroupmedia.com, and subdomains thereof, and the Zillow mobile
 13 applications on, for example, the iOS and Android operating systems. Zillow, Inc. provides online
 14 real estate listings and related services to consumers and local real estate agents through the website
 15 and mobile application instrumentalities.

16 138. Zillow Group and Zillow, Inc. directly infringe one or more claims of the '849 patent,
 17 including claims 1-9, 12-22, and 25, as described below and in Exhibit 94, Exs. A-C. Additionally,
 18 Zillow Group directs and controls the infringing behavior of its agent, Zillow, Inc., which Zillow
 19 Group operates and wholly owns.

20 139. For example, as shown in Exhibit 43, the Zillow website and Zillow mobile
 21 applications infringe at least claim 1 of the '849 patent at least by:

22 a. presenting advertising obtained from a computer network, the network
 23 including a multiplicity of user reception systems at which respective users can request applications,
 24 from the network, that include interactive services, the respective reception systems including a

25 ³⁰ Ex. 4 (Zillow Group 2018 10-K) at 3.
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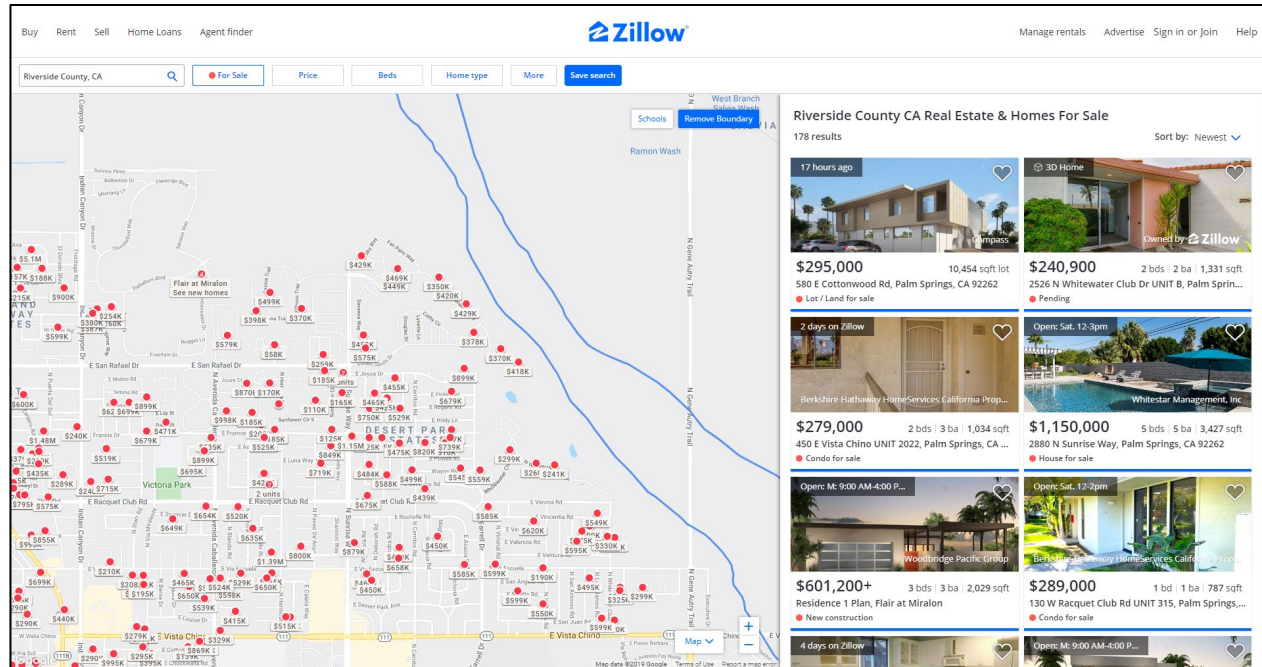
1 monitor at which at least the visual portion of the applications can be presented as one or more
2 screens of display, the method comprising the steps of:

3 b. structuring applications so that they may be presented, through the network,
4 at a first portion of one or more screens of display; and:

5 c. structuring advertising in a manner compatible to that of the applications so
6 that it may be presented, through the network, at a second portion of one or more screens of display
7 concurrently with applications, wherein structuring the advertising includes configuring the
8 advertising as objects that include advertising data and;

9 d. selectively storing advertising objects at a store established at the reception
10 system.

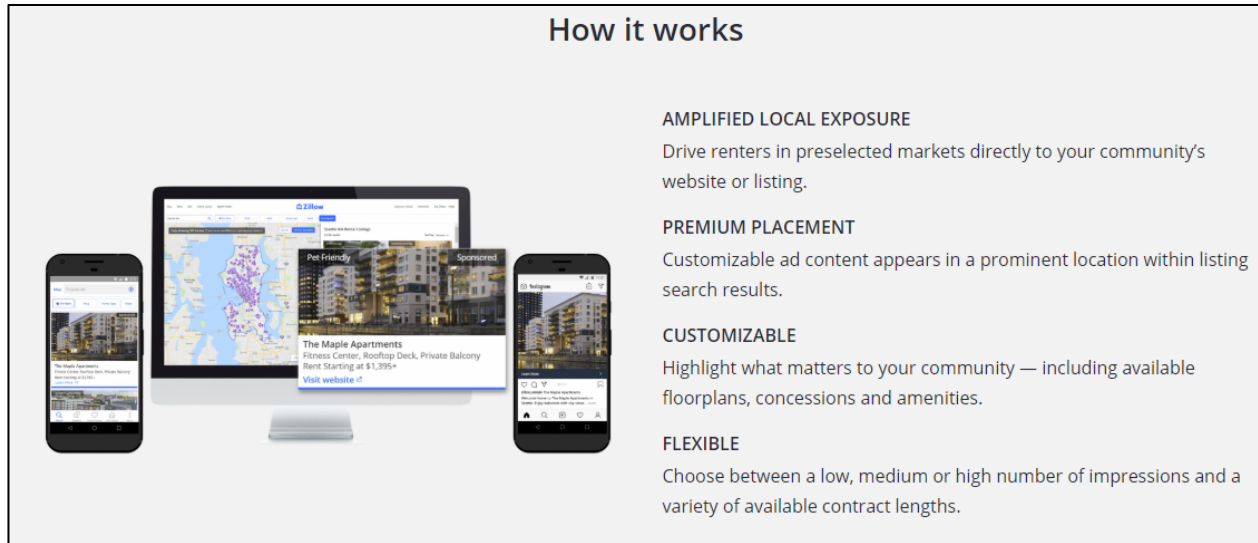
11 140. For another example, Zillow Group and Zillow, Inc. infringe at least claim 1 of the
12 '849 patent through Zillow's website and mobile applications in a similar manner to that shown in
13 Exhibit 43, at least when the advertising is from, or involves, Zillow Group Media; when the
14 advertising is for properties Zillow owns through Zillow Offers; and when the advertising is for other
15 advertised properties, such as Promoted Communities for new constructions, properties managed by
16 or associated with Premier Agent, and other properties promoted using Zillow's advertising services.



Ex. 44 (Zillow search in Riverside County, CA).

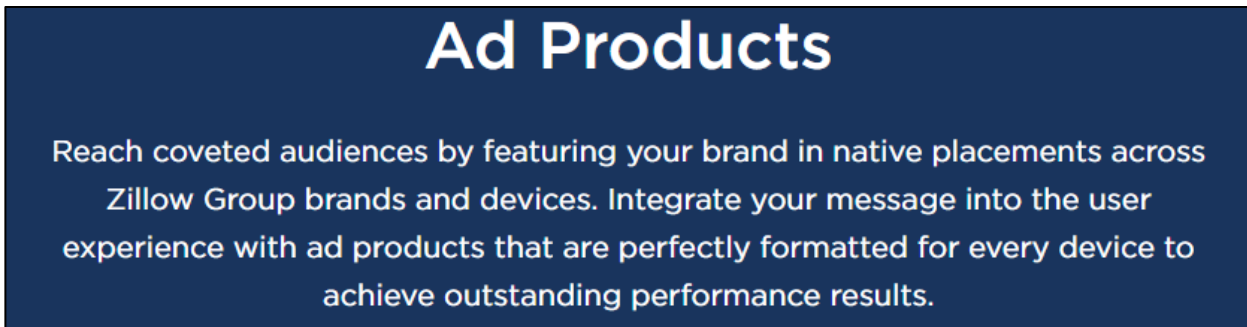


Ex. 45 (<https://www.zillow.com/resources/new-construction/training/inline-community-preview/>).



Ex. 46 (<https://www.zillow.com/marketing/rental-property-advertising/>).

141. For another example, Zillow Group and Zillow, Inc. infringe at least claim 1 of the '849 patent through the Zillow Group Media service in at least a similar manner to that shown in the Exhibit 43 claim chart:



Ex. 47 (<https://www.zillowgroupmedia.com/native-ads/>).

142. Zillow Group and Zillow, Inc. infringe at least claim 1 of the '849 patent through the Zillow mobile applications, including at least the iOS and Android Zillow Real Estate & Rentals, Zillow Rentals, and Zillow Premier Agent applications, in a similar manner as through the website.

143. Alternatively, to the extent that any step of claim 1 of the '849 patent, including the "structuring" or "selectively storing" steps, are performed by a third party (in addition to and/or separate from Zillow's performance), such as a user, browser, or mobile operating system, that

1 performance is attributable to Zillow, Inc. and Zillow Group at least because each Zillow entity has
2 an agency and/or contractual relationship with said third party and each Zillow entity controls and/or
3 directs the performance of said third party. For example, each Zillow entity controls and/or directs
4 the performance of the “selectively storing” step by users, browsers, and mobile operating systems
5 because it, for example, conditions receipt of a benefit, such as reduced latency, on the performance
6 of the claimed steps, and establishes the manner or timing of the performance by, for example,
7 determining what image and other data is cached and for how long. For another example, each
8 Zillow entity controls and/or directs the performance of the “selectively storing” step by users,
9 browsers, and mobile operating systems because it profits from the performance by, for example,
10 increasing use and user interactions from reduced latency, and each Zillow entity has the right to
11 stop or limit infringement, by, for example, determining that image and other data is not cached.

12 144. Alternatively, to the extent that any step of claim 1 of the '849 patent, including the
13 “structuring” or “selectively storing” steps, are performed by a third party (in addition to and/or
14 separate from Zillow’s performance), such as a Content Delivery Network (“CDN”) or other server,
15 including Amazon CloudFront, that performance is attributable to Zillow, Inc. and Zillow Group at
16 least because each Zillow entity has an agency and/or contractual relationship with said third party
17 and each Zillow entity controls and/or directs the performance of said third party. For example, each
18 Zillow entity controls and/or directs the performance of the “selectively storing” step by CDNs
19 because it, for example, conditions receipt of a benefit, such as payment for services, on the
20 performance of the claimed steps, and establishes the manner or timing of the performance by, for
21 example, determining what image and other data is cached and for how long. For another example,
22 each Zillow entity controls and/or directs the performance of the “selectively storing” step by CDNs
23 because it profits from the performance by, for example, increasing use and user interactions from
24 reduced latency, and each Zillow entity has the right to stop or limit infringement, by, for example,
25 determining that image and other data is not cached.

145. Zillow Group and Zillow, Inc. have had knowledge of the '849 patent and their alleged direct and indirect infringement since August 11, 2017.

146. Zillow Group and Zillow, Inc. also indirectly infringe one or more claims of the '849 patent through the Zillow website, including at least www.zillow.com, www.zillowgroupmedia.com, and subdomains thereof, and the Zillow mobile applications. On information and belief, in certain circumstances, client devices and software (e.g., devices and software used by end users and customers of Zillow's website and the associated mobile applications) directly infringe the '849 patent through the use of the website and mobile applications to view at least real estate listings. Zillow Group's Annual Report lists \$1,333,554,000 of revenue from its website and mobile applications which "generate revenue from the sale of advertising services and our suite of marketing software and technology solutions."³¹ The revenue indicates that numerous end users and customers used Zillow's website and the associated mobile applications in order to view real estate listings and thereby infringe the '849 patent. In particular, to the extent Zillow does not perform the method steps, in certain circumstances, client devices and software (e.g., devices and software used by end users and customers of Zillow's website and the associated mobile applications) perform at least the method of presenting advertising recited by claim 1 of the '849 patent as shown in Exhibit 43.

147. On information and belief, despite knowledge of the infringement of the '849 patent, Zillow Group and Zillow, Inc. have intended and continue to intend to contribute to patent infringement by third parties by selling, offering to sell, and/or supplying components, and/or a material or apparatus for use in practicing the patented methods of the '849 patent by at least end users and consumers, as described in this section.

148. For example Zillow Group and Zillow Inc. provide computer code underlying the Zillow website and mobile applications, such as HTML, JavaScript, and image files, to customers

³¹ Ex. 4 (Zillow Group 2018 10-K) at 3, 42.
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1 and end users for use in infringing the '849 patent and such computer code does not have substantial
2 non-infringing uses. Such computer code is especially made and/or especially adapted for use in
3 infringing the '849 patent and is not a staple article or commodity of commerce suitable for
4 substantial non-infringing use. The only substantial use of Zillow's computer code responses is for
5 the claimed subject matter involving presenting applications and advertisements in an interactive
6 service as described in the '849 patent.

7 149. Further, on information and belief, as a part of providing said computer code, Zillow
8 Group and Zillow, Inc. enter into binding contracts with end users and customers to use Zillow's
9 website and mobile applications, including in an infringing manner including by binding the users
10 to a terms of use for the accused website and mobile applications. On information and belief, Zillow
11 Group and Zillow, Inc. receive valuable consideration from customers and end users located in this
12 judicial district, including information provided by customers and end users, and/or information
13 automatically collected from customers and end users. When customers and end users in this judicial
14 district use the accused website and/or mobile applications, Zillow Group and Zillow, Inc. collect
15 information about the customers and end users, their devices, and their interaction with the accused
16 website and the associated mobile applications. Zillow Group and Zillow, Inc. work with service
17 providers and advertising networks to track and manage cookie information and activities of
18 customers and end users across different websites and devices. Third parties use cookie information
19 collected by Zillow Group and Zillow, Inc. to deliver advertisements to end users and customers
20 based on their use of the accused website and mobile applications. Zillow Group and Zillow, Inc.'s
21 business is primarily funded through advertising. The application and website are especially made
22 and/or especially adapted for use in infringing the Patents-in-Suit, at least as detailed in the individual
23 Counts above, and are not a staple article or commodity of commerce suitable for substantial non-
24 infringing uses because, among other things, the components sent to users are uniquely designed
25 only to access the infringing aspects of Zillow's website and mobile applications.

1 150. On information and belief, despite their knowledge of the infringement of the '849
2 patent, Zillow Group and Zillow, Inc. have intended and continue to intend to induce patent
3 infringement by third parties, including at least the direct infringement by end users and customer,
4 as described in this section. Zillow has encouraged and instructed and continues to encourage and
5 instruct customers and end users to use Zillow's website and the associated mobile applications in a
6 manner that infringes the '849 patent by advertising the website and mobile applications, providing
7 customer support, and designing their website and mobile applications in such a way that the use of
8 the website and mobile applications by an end user or customer infringes the '849 patent.

9 151. For example, Zillow has encouraged and instructed and continues to encourage and
10 instruct customers and end users to use Zillow's website and the associated mobile applications in
11 an infringing manner by providing customer support and designing their website and mobile
12 applications in such a way that the use of the website and mobile applications by an end user or
13 customer infringes the Patents-in-Suit. For example, on information and belief, customer service to
14 encourage and support customers and end users in their use of Zillow's website and the associated
15 mobile applications in an infringing manner. For another example,
16 <https://zillow.zendesk.com/hc/en-us> provides direction and support for Zillow's website. On
17 information and belief, to the extent Zillow was not aware that they were encouraging their
18 customers and end users to infringe the '849 patent, its lack of knowledge was based on being
19 willfully blind to the possibility that their acts would cause infringement.

20 152. IBM has been damaged by the infringement of its '849 patent by Zillow and will
21 continue to be damaged by such infringement. IBM is entitled to recover from Zillow the damages
22 sustained by IBM as a result of Zillow's wrongful acts.

23 153. The infringement by Zillow of the '849 patent was, and continues to be, deliberate
24 and willful, entitling IBM to increased damages under 35 U.S.C. § 284 and to attorney fees and costs
25 incurred in prosecuting this action under 35 U.S.C. § 285. In committing these acts of infringement,

1 Zillow actually knew or should have known that their actions constituted an unjustifiably high risk
2 of infringement of a valid and enforceable patent.

3 154. IBM has suffered and continues to suffer irreparable harm, for which there is no
4 adequate remedy at law, and will continue to do so unless Zillow is enjoined therefrom by this Court.
5 In committing these acts of infringement, Zillow actually knew or should have known that its actions
6 constituted an unjustifiably high risk of infringement of a valid and enforceable patent.

7 155. Zillow alleges that it does not infringe the claims of the '849 patent because the patent
8 claims a specific way of solving a technical problem that Zillow alleges it does not perform through
9 its website and/or mobile applications. *See* Exhibit 95, Appendix 1. Although IBM disagrees with
10 Zillow's contentions, those contentions demonstrate that Zillow agrees that the invention of the '849
11 patent teaches a particular way to solve a specific technical problem.

12 **COUNT TWO**

13 **INFRINGEMENT OF THE '346 PATENT**

14 156. IBM incorporates by reference paragraphs 1-155.

15 157. IBM is the owner of all right, title and interest in the '346 patent. The '346 patent
16 was duly and properly issued by the USPTO on December 8, 2009. The '346 patent was duly
17 assigned to IBM. A copy of the '346 patent is attached hereto as Exhibit 48.

18 158. The '346 patent is valid and enforceable.

19 159. In violation of 35 U.S.C. § 271, Zillow has infringed one or more of the claims of the
20 '346 patent by having made, designed, offered for sale, sold, provided, used, maintained, and/or
21 supported their website, including at least www.zillow.com, www.zillowgroupmedia.com, and
22 subdomains thereof, and the associated mobile applications, including the Zillow applications for
23 mobile devices running on, for example, the Apple iOS and Google Android operating systems,
24 including at least Zillow Real Estate & Rentals, Zillow Rentals, and Zillow Premier Agent
25 applications. Zillow's infringement is continuing.

1 160. Zillow Group “operates the largest portfolio of real estate and home-related brands
2 on mobile and the web which focus on all stages of the home lifecycle: renting, buying, selling and
3 financing. . . . The Zillow Group portfolio of consumer brands includes Zillow”³² Zillow
4 Group’s “technology solutions” and actions related to such technology infringe and/or direct or
5 control infringement through Zillow’s website and through the mobile application instrumentalities.

6 161. Zillow, Inc. owns and operates the Zillow website, including at least
7 www.zillow.com, www.zillowgroupmedia.com, and subdomains thereof, and the Zillow mobile
8 applications on, for example, the iOS and Android operating systems. Zillow, Inc. provides online
9 real estate listings and related services to consumers and local real estate agents through the website
10 and mobile application instrumentalities.

11 162. Zillow Group and Zillow, Inc. directly infringe one or more claims of the ’346 patent,
12 including claims 1-3, 5, 8, 10, and 12-13, as described below and in Exhibit 94, Exs. D-E.
13 Additionally, Zillow Group directs and controls the infringing behavior of its agent, Zillow, Inc.,
14 which Zillow Group operates and wholly owns.

15 163. For example, as shown in Exhibit 49, the Zillow website and Zillow mobile
16 applications infringe at least claim 1 of the ’346 patent at least by:

17 a. managing user authentication within a distributed data processing system,
18 wherein a first system and a second system interact within a federated computing environment and
19 support single-sign-on operations in order to provide access to protected resources, at least one of
20 the first system and the second system comprising a processor, the method comprising:

21 b. triggering a single-sign-on operation on behalf of the user in order to obtain
22 access to a protected resource that is hosted by the second system, wherein the second system
23 requires a user account for the user to complete the single-sign-on operation prior to providing access
24 to the protected resource;

25 ³² Ex. 4 (Zillow Group 2018 10-K) at 3.
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1 c. receiving from the first system at the second system an identifier associated
2 with the user; and

3 d. creating a user account for the user at the second system based at least in part
4 on the received identifier associated with the user after triggering the single-sign-on operation but
5 before generating at the second system a response for accessing the protected resource, wherein the
6 created user account supports single-sign-on operations between the first system and the second
7 system on behalf of the user.

8 164. The Zillow mobile applications, including at least the Zillow Real Estate & Rentals
9 and the Zillow Rentals applications, infringe at least claim 1 of the '346 patent in a similar manner
10 as through the website.

11 165. Alternatively, to the extent that any step of claim 1 of the '346 patent, including the
12 "triggering" step, is performed by a third party (in addition to and/or separate from Zillow's
13 performance), such as a user, browser, or mobile operating system, that performance is attributable
14 to Zillow, Inc. and Zillow Group at least because each Zillow entity has an agency and/or contractual
15 relationship with said third party and each Zillow entity controls and/or directs the performance of
16 said third party. For example, each Zillow entity controls and/or directs the performance of the
17 "triggering" step by users, browsers, and mobile operating systems because it, for example,
18 conditions receipt of a benefit, such as access to certain applications on Zillow's website and mobile
19 applications, on the performance of the claimed steps, and establishes the manner or timing of the
20 performance by, for example, triggering the single-sign-on operation using its underlying computer
21 code. For another example, each Zillow entity controls and/or directs the performance of the
22 "triggering" step by users, browsers, and mobile operating systems because it profits from the
23 performance by, for example, increasing the number of signed-in users accessing Zillow's website
24 and mobile applications, and each Zillow entity has the right to stop or limit infringement, by, for
25 example, not enabling the use of single-sign-on operations or account creation.

1 166. Zillow Group and Zillow, Inc. have had knowledge of the '346 patent and their
2 alleged direct and indirect infringement since October 31, 2017.

3 167. IBM has been damaged by the infringement of its '346 patent by Zillow and will
4 continue to be damaged by such infringement. IBM is entitled to recover from Zillow the damages
5 sustained by IBM as a result of Zillow's wrongful acts.

6 168. The infringement by Zillow of the '346 patent was, and continues to be, deliberate
7 and willful, entitling IBM to increased damages under 35 U.S.C. § 284 and to attorney fees and costs
8 incurred in prosecuting this action under 35 U.S.C. § 285. In committing these acts of infringement,
9 Zillow actually knew or should have known that its actions constituted an unjustifiably high risk of
10 infringement of a valid and enforceable patent.

11 169. IBM has suffered and continues to suffer irreparable harm, for which there is no
12 adequate remedy at law, and will continue to do so unless Zillow is enjoined therefrom by this Court.
13 In committing these acts of infringement, Zillow actually knew or should have known that their
14 actions constituted an unjustifiably high risk of infringement of a valid and enforceable patent.

15 170. Zillow alleges that it does not infringe the claims of the '346 patent because the patent
16 claims a specific way of solving a technical problem that Zillow alleges it does not perform through
17 its website and/or mobile applications. *See* Exhibit 95, Appendix 4. Although IBM disagrees with
18 Zillow's contentions, those contentions demonstrate that Zillow agrees that the invention of the '346
19 patent teaches a particular way to solve a specific technical problem.

20 **COUNT THREE**

21 **INFRINGEMENT OF THE '183 PATENT**

22 171. IBM incorporates by reference paragraphs 1-170.

23 172. IBM is the owner of all right, title and interest in the '183 patent. The '183 patent
24 was duly and properly issued by the USPTO on January 26, 2016. The '183 patent was duly assigned
25 to IBM. A copy of the '183 patent is attached hereto as Exhibit 50.

173. The '183 patent is valid and enforceable.

174. In violation of 35 U.S.C. § 271, Zillow has infringed, contributed to the infringement of, and/or induced others to infringe one or more of the claims of the '183 patent by having made, designed, offered for sale, sold, provided, used, maintained, and/or supported their website, including at least www.zillow.com, www.zillowgroupmedia.com, and subdomains thereof, and the associated mobile applications, including the Zillow applications for mobile devices running on, for example, the Apple iOS and Google Android operating systems, including at least Zillow Real Estate & Rentals, Zillow Rentals, and Zillow Premier Agent applications. Zillow's infringement is continuing.

175. Zillow Group "operates the largest portfolio of real estate and home-related brands on mobile and the web which focus on all stages of the home lifecycle: renting, buying, selling and financing. . . . The Zillow Group portfolio of consumer brands includes Zillow" ³³ Zillow Group's "technology solutions" and actions related to such technology infringe, direct or control infringement, induce infringement, and/or contribute to the infringement through Zillow's website and through the mobile application instrumentalities.

176. Zillow, Inc. owns and operates the Zillow website, including at least www.zillow.com, www.zillowgroupmedia.com, and subdomains thereof, and the Zillow mobile applications on, for example, the iOS and Android operating systems. Zillow, Inc. provides online real estate listings and related services to consumers and local real estate agents through the website and mobile application instrumentalities.

177. Zillow Group and Zillow, Inc. directly infringe one or more claims of the '183 patent, including claims 1-20, as described below and in Exhibit 94, Exs. T-Y. Additionally, Zillow Group directs and controls the infringing behavior of its agent, Zillow, Inc., which Zillow Group operates and wholly owns.

³³ Ex. 4 (Zillow Group 2018 10-K) at 3.
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1 178. For example, as shown in Exhibit 51, the Zillow website and Zillow mobile
2 applications infringe at least claim 1 of the '183 patent at least by:

3 a. retrieving in real time, by a computer processor of a computing system, image
4 data associated with a plurality of locations within a specified geographical area;

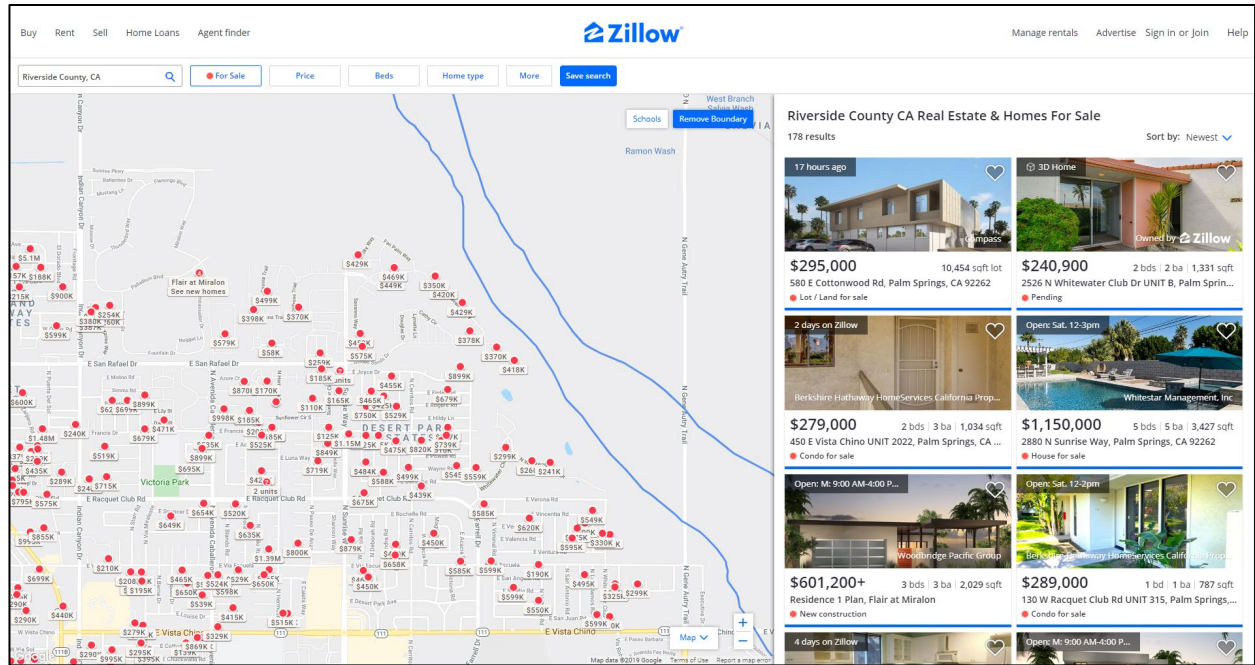
5 b. comparing, by said computer processor, said image data to a plurality of
6 stored image data, wherein said plurality of stored image data comprise baseline measurement values
7 associated with an expected condition level of baseline locations within a baseline geographical area;

8 c. calculating, by said computer processor based on results of said comparing,
9 condition score values associated with said plurality of locations, wherein said condition score values
10 indicate real time condition values associated with said plurality of locations;

11 d. calculating, by said computer processor based on said condition score values,
12 an overall condition score value associated with said specified geographical area; and

13 e. generating, by said computer processor, a map indicating said overall
14 condition score value associated with said specified geographical area.

15 179. For another example, Zillow Group and Zillow, Inc. infringe at least claim 1 of the
16 '183 patent through Zillow's website and mobile applications in a similar manner to that shown in
17 the Exhibit 51 claim chart at least when the properties are from, or involve, Zillow Group Media;
18 when the properties are properties Zillow owns through Zillow Offers; and when the properties are,
19 for example, properties from Promoted Communities for new constructions, properties managed by
20 or associated with Premier Agent, and other properties promoted using Zillow's advertising services.



Ex. 44 (Zillow search in Riverside County, CA).

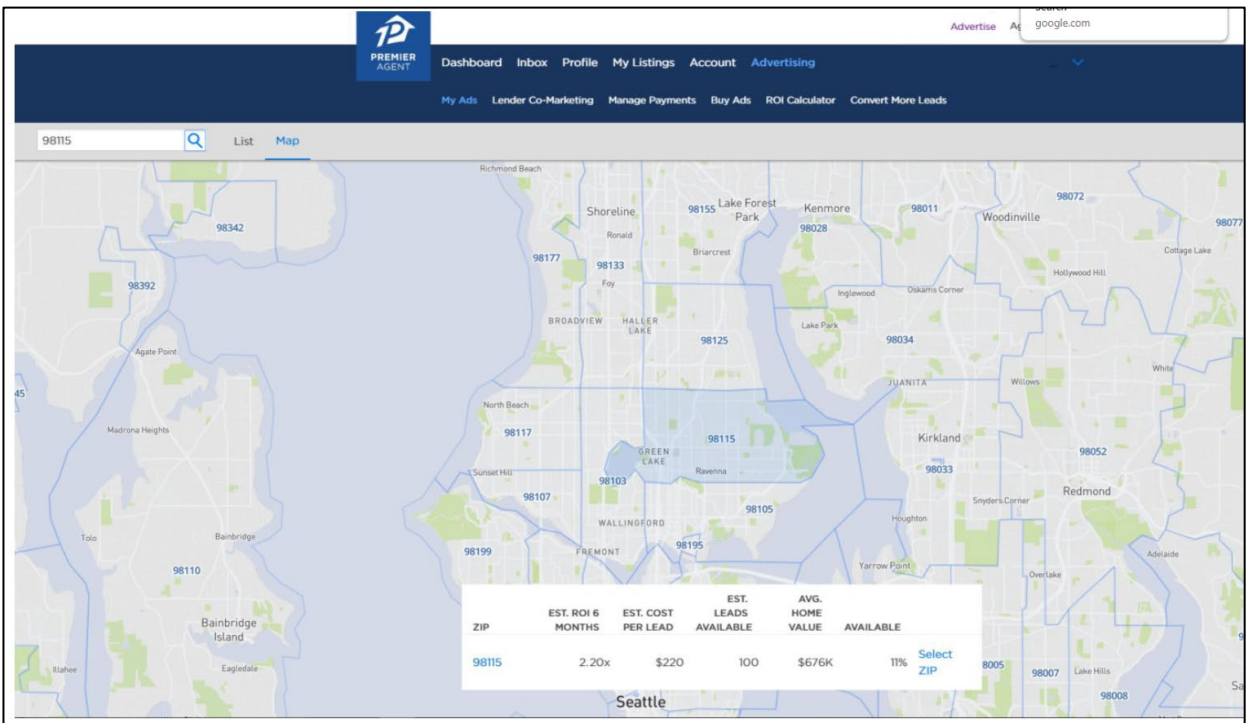


Ex. 45 (<https://www.zillow.com/resources/new-construction/training/inline-community-preview/>).

180. For another example, Zillow Group and Zillow, Inc. infringe at least claim 1 of the '183 patent through the Premier Agent service in at least a similar manner to that shown in the Exhibit 51 claim chart:

Active ZIPS [®]							Total Budget: \$7,943.50
ZIP	AVG HOME VALUE	EST. LEADS	EST. COST PER LEAD	EST. ROI 6 MONTHS	SHARE OF VOICE	MONTHLY BUDGET	
98290	\$443K	21.4	\$112	3.95x	46.6%	\$1,405	⋮
98125	\$558K	15.3	\$204	2.74x	67.9%	\$3,109	⋮
98155	\$515K	11.2	\$213	2.42x	46.0%	\$1,985	⋮
98275	\$531K	7.0	\$114	2.57x	55.5%	\$1,445	⋮

Ex. 52 (<https://www.zillow.com/agent-resources/training/manage-premier-agent-advertising/manage-your-advertising-on-zillow/>).



Ex. 52 (<https://www.zillow.com/agent-resources/training/manage-premier-agent-advertising/manage-your-advertising-on-zillow/>).

181. The Zillow mobile applications, including at least the Zillow Real Estate & Rentals, Zillow Rentals, and Zillow Premier Agent applications, infringe at least claim 1 of the '183 patent in a similar manner as through the website.

182. Alternatively, to the extent that any step of claim 1 of the '183 patent, including the “generating” step, is performed by a third party (in addition to and/or separate from Zillow’s performance), such as a user, browser, or mobile operating system, that performance is attributable to Zillow, Inc. and Zillow Group at least because each Zillow entity has an agency and/or contractual relationship with said third party and each Zillow entity controls and/or directs the performance of said third party. For example, each Zillow entity controls and/or directs the performance of the “generating” step by users, browsers, and mobile operating systems because it, for example, conditions receipt of a benefit, such as viewing accurate home and neighborhood value estimates, on the performance of the claimed steps, and establishes the manner or timing of the performance by, for example, determining the method by which the Zestimate and ZHVI is calculated and the map is generated using computer code, such as HTML and JavaScript. For another example, each Zillow entity controls and/or directs the performance of the “generating” step by users, browsers, and mobile operating systems because it profits from the performance by, for example, increasing the number of users through updated home and neighborhood valuations, and each Zillow entity has the right to stop or limit infringement, by, for example, removing this image processing feature from the Zestimate feature or not providing computer code to generate the map.

183. Alternatively, to the extent any step of claim 1 of the '183 patent, including the “generating” step, is performed by a third party (in addition to and/or separate from Zillow’s performance), such as a Content Delivery Network (“CDN”) or other server, including Amazon CloudFront, that performance is attributable to Zillow, Inc. and Zillow Group at least because each Zillow entity has an agency and/or contractual relationship with said third party and each Zillow entity controls and/or directs the performance of said third party. For example, each Zillow entity

controls and/or directs the performance of the “generating” step by CDNs because it, for example, conditions receipt of a benefit, such as payment for services, on the performance of the claimed steps, and establishes the manner or timing of the performance by, for example, determining the method by which the Zestimate and ZHVI is calculated and the map is generated using computer code, such as HTML and JavaScript. For another example, each Zillow entity controls and/or directs the performance of the “generating” step by CDNs because it profits from the performance by, for example, increasing the number of users through updated home and neighborhood valuations, and each Zillow entity has the right to stop or limit infringement, by, for example, removing this image processing feature from the Zestimate feature or not providing computer code to generate the map.

184. Zillow Group and Zillow, Inc. have had knowledge of the ’183 patent and their alleged direct and indirect infringement since January 14, 2019.

185. Zillow Group and Zillow, Inc. also indirectly infringe one or more claims of the ’183 patent through the Zillow website, including at least www.zillow.com, www.zillowgroupmedia.com, and subdomains thereof, and the Zillow mobile applications. On information and belief, in certain circumstances, client devices and software (e.g., devices and software used by end users and customers of Zillow’s website and the associated mobile applications) directly infringe the ’183 patent through the use of the website and mobile applications to view at least real estate listings, Zestimates, and Zillow Home Value Indexes. Zillow Group’s Annual Report lists \$1,333,554,000 of revenue from its website and mobile applications which “generate revenue from the sale of advertising services and our suite of marketing software and technology solutions.”³⁴ The revenue indicates that numerous end users and customers used Zillow’s website and the associated mobile application in order to view real estate listings, Zestimates, and ZHVI values and thereby infringe the ’183 patent. In particular, to the extent Zillow does not perform the method steps, in certain circumstances, client devices and software (e.g.,

³⁴ Ex. 4 (Zillow Group 2018 10-K) at 3, 42.
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1 devices and software used by end users and customers of Zillow's website and the associated mobile
2 applications) perform at least the method of calculating geographical condition score values recited
3 by claim 1 of the '183 patent as shown in Exhibit 51.

4 186. On information and belief, despite knowledge of the infringement of the '183 patent,
5 Zillow Group and Zillow, Inc. have intended and continue to intend to contribute to patent
6 infringement by third parties by selling, offering to sell, and/or supplying components, and/or a
7 material or apparatus for use in practicing the patented methods of the '183 patent by at least end
8 users and consumers, as described in this section.

9 187. For example Zillow Group and Zillow Inc. provide computer code underlying the
10 Zillow website and mobile applications, such as HTML, JavaScript, and image files, to customers
11 and end users for use in infringing the '183 patent and such computer code does not have substantial
12 non-infringing uses. Such computer code is especially made and/or especially adapted for use in
13 infringing the '183 patent and is not a staple article or commodity of commerce suitable for
14 substantial non-infringing use. The only substantial use of Zillow's computer code responses is for
15 the claimed subject matter involving calculating geographical condition score values using image
16 data as described in the '183 patent.

17 188. Further, on information and belief, as a part of providing said computer code, Zillow
18 Group and Zillow, Inc. enter into binding contracts with end users and customers to use Zillow's
19 website and mobile applications, including in an infringing manner including by binding the users
20 to a terms of use for the accused website and mobile applications. On information and belief, Zillow
21 Group and Zillow, Inc. receive valuable consideration from customers and end users located in this
22 judicial district, including information provided by customers and end users, and/or information
23 automatically collected from customers and end users. When customers and end users in this judicial
24 district use the accused website and/or mobile applications, Zillow Group and Zillow, Inc. collect
25 information about the customers and end users, their devices, and their interaction with the accused

1 website and the associated mobile application. Zillow Group and Zillow, Inc. work with service
2 providers and advertising networks to track and manage cookie information and activities of
3 customers and end users across different websites and devices. Third parties use cookie information
4 collected by Zillow Group and Zillow, Inc. to deliver advertisements to end users and customers
5 based on their use of the accused website and mobile applications. Zillow Group and Zillow, Inc.'s
6 business is primarily funded through advertising. The applications and website are especially made
7 and/or especially adapted for use in infringing the Patents-in-Suit, at least as detailed in the individual
8 Counts above, and are not a staple article or commodity of commerce suitable for substantial non-
9 infringing uses because, among other things, the components sent to users are uniquely designed
10 only to access the infringing aspects of Zillow's website and mobile applications.

11 189. On information and belief, despite their knowledge of the infringement of the '183
12 patent, Zillow Group and Zillow, Inc. have intended and continue to intend to induce patent
13 infringement by third parties, including at least the direct infringement by end users and customer,
14 as described in this section. Zillow has and continues to encourage and instruct customers and end
15 users to use Zillow's website and the associated mobile applications in a manner that infringes the
16 '183 patent by advertising the website and mobile applications, providing customer support, and
17 designing their website and mobile applications in such a way that the use of the website and mobile
18 applications by an end user or customer infringes the '183 patent.

19 190. For example, Zillow has encouraged and continues to encourage and instruct
20 customers and end users to use Zillow's website and the associated mobile applications in an
21 infringing manner by providing customer support and designing their website and mobile
22 applications in such a way that the use of the website and mobile applications by an end user or
23 customer infringes the Patents-in-Suit. For example, on information and belief, Zillow's customer
24 service encourages and supports customers and end users in their use of Zillow's website and the
25 associated mobile applications in an infringing manner. For another example,

1 <https://zillow.zendesk.com/hc/en-us> provides direction and support Zillow's website. As of
2 November 11, 2019, which is after the filing of the Complaint, Zillow continues to instructs its
3 customers and end users in this judicial district to edit, add, or remove photos to influence Zestimate
4 values in a manner that infringes at least claim 1 of the '183 patent.³⁵ On information and belief, to
5 the extent Zillow was not aware that they were encouraging their customers and end users to infringe
6 the '183 patent, its lack of knowledge was based on being willfully blind to the possibility that their
7 acts would cause infringement.

8 191. IBM has been damaged by the infringement of its '183 patent by Zillow and will
9 continue to be damaged by such infringement. IBM is entitled to recover from Zillow the damages
10 sustained by IBM as a result of Zillow's wrongful acts.

11 192. The infringement by Zillow of the '183 patent was, and continues to be, deliberate
12 and willful, entitling IBM to increased damages under 35 U.S.C. § 284 and to attorney fees and costs
13 incurred in prosecuting this action under 35 U.S.C. § 285. In committing these acts of infringement,
14 Zillow actually knew or should have known that its actions constituted an unjustifiably high risk of
15 infringement of a valid and enforceable patent.

16 193. IBM has suffered and continues to suffer irreparable harm, for which there is no
17 adequate remedy at law, and will continue to do so unless Zillow is enjoined therefrom by this Court.
18 In committing these acts of infringement, Zillow actually knew or should have known that its actions
19 constituted an unjustifiably high risk of infringement of a valid and enforceable patent.

20 194. Zillow alleges that it does not infringe the claims of the '183 patent because the patent
21 claims a specific way of solving a technical problem that Zillow alleges it does not perform through
22 its website and/or mobile applications. *See* Exhibit 95, Appendices 7-8. Although IBM disagrees
23

24 ³⁵ Ex. 53 ([https://zillow.zendesk.com/hc/en-us/articles/203511930-How-do-I-add-or-remove-](https://zillow.zendesk.com/hc/en-us/articles/203511930-How-do-I-add-or-remove-photos-of-my-home-)
25 [photos-of-my-home-\);](https://www.zillow.com/sellerlanding/edityourhome/) Ex. 54 (<https://www.zillow.com/sellerlanding/edityourhome/>); Ex. 55
(<https://www.zillow.com/blog/zestimate-updates-230614/>).

with Zillow's contentions, those contentions demonstrate that Zillow agrees that the invention of the '183 patent teaches a particular way to solve a specific technical problem.

COUNT FOUR

INFRINGEMENT OF THE '789 PATENT

195. IBM incorporates by reference paragraphs 1-194.

196. IBM is the owner of all right, title and interest in the '789 patent. The '789 patent was duly and properly issued by the USPTO on Oct. 13, 2015. The '789 patent was duly assigned to IBM. A copy of the '789 patent is attached hereto as Exhibit 56.

197. The '789 patent is valid and enforceable.

198. In violation of 35 U.S.C. § 271, Zillow has infringed, contributed to the infringement of, and/or induced others to infringe one or more of the claims of the '789 patent by having made, designed, offered for sale, sold, provided, used, maintained, and/or supported its website, including at least www.zillow.com, www.zillowgroupmedia.com, and subdomains thereof, and the associated mobile applications, including the Zillow applications for mobile devices running on, for example, the Apple iOS and Google Android operating systems, including at least Zillow Real Estate & Rentals, Zillow Rentals, and Zillow Premier Agent applications. Zillow's infringement is continuing.

199. Zillow Group "operates the largest portfolio of real estate and home-related brands on mobile and the web which focus on all stages of the home lifecycle: renting, buying, selling and financing. . . . The Zillow Group portfolio of consumer brands includes Zillow" ³⁶ Zillow Group's "technology solutions" and actions related to such technology infringe, direct or control infringement, induce infringement, and/or contribute to the infringement through Zillow's website and through the mobile application instrumentalities.

³⁶ Ex. 4 (Zillow Group 2018 10-K) at 3.
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1 200. Zillow, Inc. owns and operates the Zillow website, including at least
2 www.zillow.com, www.zillowgroupmedia.com, and subdomains thereof, and the Zillow mobile
3 applications on, for example, the iOS and Android operating systems. Zillow, Inc. provides online
4 real estate listings and related services to consumers and local real estate agents through the website
5 and mobile application instrumentalities.

6 201. Zillow Group and Zillow, Inc. directly infringe one or more claims of the '789 patent,
7 including claims 1-2, 5-9, and 12-20, as described below, and in Exhibit 94, Exs. O-S. Additionally,
8 Zillow Group directs and controls the infringing behavior of its agent, Zillow, Inc., which Zillow
9 Group operates and wholly owns.

10 202. For example, as shown in Exhibit 57 the Zillow website and Zillow mobile
11 applications infringe at least claim 8 of the '789 patent at least by:

12 a. presenting a map display on a display device, wherein the map display
13 comprises elements within a viewing area of the map display, wherein the elements comprise
14 geospatial characteristics, wherein the elements comprise selected and unselected elements;

15 b. presenting a list display on the display device, wherein the list display
16 comprises a customizable list comprising the elements from the map display;

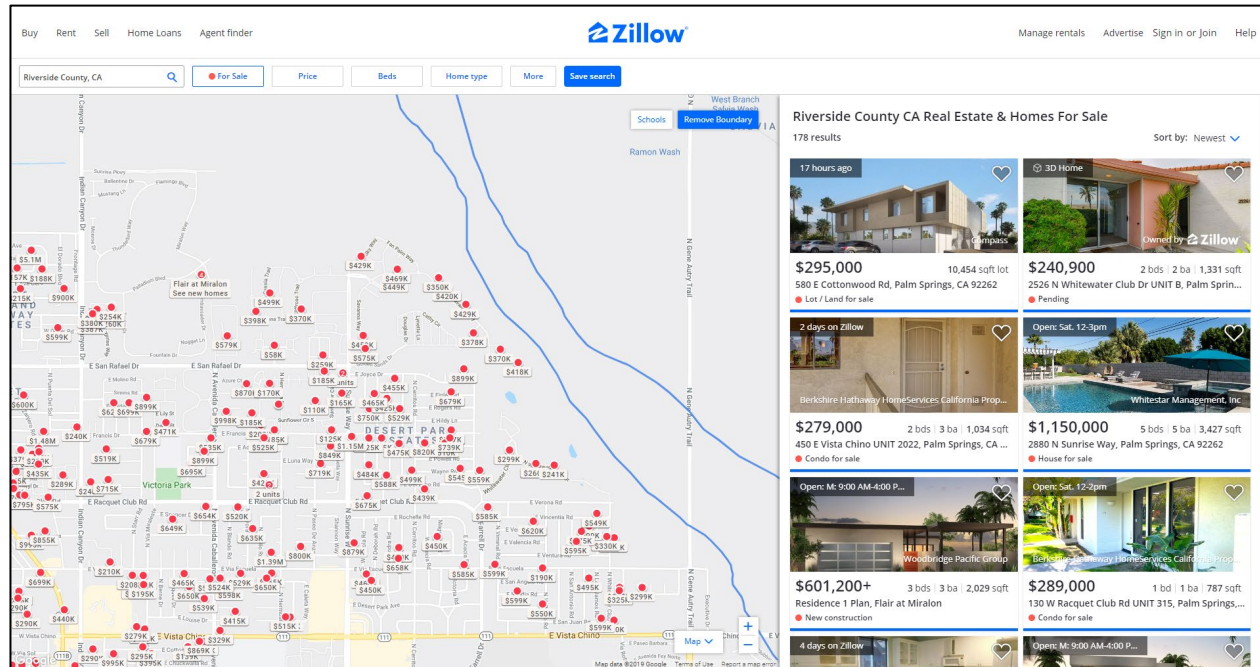
17 c. receiving a user input drawing a selection area in the viewing area of the map
18 display, wherein the selection area is a user determined shape, wherein the selection area is smaller
19 than the viewing area of the map display, wherein the viewing area comprises elements that are
20 visible within the map display and are outside the selection area;

21 d. selecting any unselected elements within the selection area in response to the
22 user input drawing the selection area and deselecting any selected elements outside the selection area
23 in response to the user input drawing the selection area; and

24 e. synchronizing the map display and the list display to concurrently update the
25 selection and deselection of the elements according to the user input, the selection and deselection

occurring on both the map display and the list display.

203. For another example, Zillow Group and Zillow, Inc. infringe at least claim 8 of the '789 patent through Zillow's website and mobile applications in a similar manner to that shown in the Exhibit 57 claim chart, at least when the shown properties are from, or involve, Zillow Group Media; when the shown properties are properties Zillow owns through Zillow Offers; and when the shown properties are, for example, properties from Promoted Communities for new constructions, properties managed by or associated with Premier Agent, and other properties promoted using Zillow's advertising services.



Ex. 44 (Zillow search in Riverside County, CA).



10 Ex. 45 (<https://www.zillow.com/resources/new-construction/training/inline-community-preview/>).

11

12 204. The Zillow mobile applications, including at least the Zillow Real Estate & Rentals,
13 Zillow Rentals, and Zillow Premier Agent applications, infringe at least claim 8 of the '789 patent
14 in a similar manner as through the website.

15 205. Alternatively, to the extent that any step of claim 8 of the '789 patent, including the
16 “receiving a user input” step, is performed by a third party (in addition to and/or separate from
17 Zillow’s performance), such as a user, browser, or mobile operating system, that performance is
18 attributable to Zillow, Inc. and Zillow Group at least because each Zillow entity has an agency and/or
19 contractual relationship with said third party and each Zillow entity controls and/or directs the
20 performance of said third party. For example, each Zillow entity controls and/or directs the
21 performance of the “receiving a user input” step by users, browsers, and mobile operating systems
22 because it, for example, conditions receipt of a benefit, such as selecting a specific map area to
23 search, on the performance of the claimed steps, and establishes the manner or timing of the
24 performance by, for example, providing and controlling the Draw Your Own Search functionality.
25 For another example, each Zillow entity controls and/or directs the performance of the “receiving a

1 user input” step by users, browsers, and mobile operating systems because it profits from the
2 performance by, for example, increasing use and user interactions from improved search
3 functionality, and each Zillow entity has the right to stop or limit infringement, by, for example,
4 removing the Draw Your Own Search feature.

5 206. Alternatively, to the extent any step of claim 8 of the ’789 patent, including the
6 “receiving a user input” step, is performed by a third party (in addition to and/or separate from
7 Zillow’s performance), such as a Content Delivery Network (“CDN”) or other server, including
8 Amazon CloudFront, that performance is attributable to Zillow, Inc. and Zillow Group at least
9 because each Zillow entity has an agency and/or contractual relationship with said third party and
10 each Zillow entity controls and/or directs the performance of said third party. For example, each
11 Zillow entity controls and/or directs the performance of the “receiving a user input” step by CDNs
12 because it, for example, conditions receipt of a benefit, such as payment for services, on the
13 performance of the claimed steps, and establishes the manner or timing of the performance by, for
14 example, providing and controlling the Draw Your Own Search functionality. For another example,
15 each Zillow entity controls and/or directs the performance of the “receiving a user input” step by
16 CDNs because it profits from the performance by, for example, increasing use and user interactions
17 from improved search functionality, and each Zillow entity has the right to stop or limit infringement,
18 by, for example, removing the Draw Your Own Search feature.

19 207. Zillow Group and Zillow, Inc. have had knowledge of the ’789 patent and their
20 alleged direct and indirect infringement since August 11, 2017.

21 208. Zillow Group and Zillow, Inc. also indirectly infringe one or more claims of the ’789
22 patent through the Zillow website, including at least www.zillow.com,
23 www.zillowgroupmedia.com, and subdomains thereof, and the Zillow mobile applications. On
24 information and belief, in certain circumstances, client devices and software (e.g., devices and
25 software used by end users and customers of Zillow’s website and the associated mobile

1 applications) directly infringe the '789 patent through the use of the website and mobile applications
2 to view at least real estate listings. Zillow Group's Annual Report lists \$1,333,554,000 of revenue
3 from its website and mobile applications which "generate revenue from the sale of advertising
4 services and our suite of marketing software and technology solutions."³⁷ The revenue indicates that
5 numerous end users and customers used Zillow's website and the associated mobile application in
6 order to view real estate listings and thereby infringe the '789 patent. In particular, to the extent
7 Zillow does not perform the method steps, in certain circumstances, client devices and software (e.g.,
8 devices and software used by end users and customers of Zillow's website and the associated mobile
9 applications) perform at least the method of coordinated geospatial and list-based mapping recited
10 by claim 8 of the '789 patent as shown in Exhibit 57.

11 209. On information and belief, despite knowledge of the infringement of the '789 patent,
12 Zillow Group and Zillow, Inc. have intended and continue to intend to contribute to patent
13 infringement by third parties by selling, offering to sell, and/or supplying components, and/or a
14 material or apparatus for use in practicing the patented methods of the '789 patent by at least end
15 users and consumers, as described in this section.

16 210. For example Zillow Group and Zillow Inc. provide computer code underlying the
17 Zillow website and mobile applications, such as HTML, JavaScript, and image files, to customers
18 and end users for use in infringing the '789 patent and such computer code does not have substantial
19 non-infringing uses. Such computer code is especially made and/or especially adapted for use in
20 infringing the '789 patent and is not a staple article or commodity of commerce suitable for
21 substantial non-infringing use. The only substantial use of Zillow's computer code responses is for
22 the claimed subject matter involving coordinated geospatial and list-based mapping as described in
23 the '789 patent.

24
25 ³⁷ Ex. 4 (Zillow Group 2018 10-K) at 3, 42.
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211. Further, on information and belief, as a part of providing said computer code, Zillow Group and Zillow, Inc. enter into binding contracts with end users and customers to use Zillow's website and mobile applications, including in an infringing manner including by binding the users to a terms of use for the accused website and mobile applications. On information and belief, Zillow Group and Zillow, Inc. receive valuable consideration from customers and end users located in this judicial district, including information provided by customers and end users, and/or information automatically collected from customers and end users. When customers and end users in this judicial district use the accused website and/or mobile applications, Zillow Group and Zillow, Inc. collect information about the customers and end users, their devices, and their interaction with the accused website and the associated mobile applications. Zillow Group and Zillow, Inc. work with service providers and advertising networks to track and manage cookie information and activities of customers and end users across different websites and devices. Third parties use cookie information collected by Zillow Group and Zillow, Inc. to deliver advertisements to end users and customers based on their use of the accused website and mobile applications. Zillow Group and Zillow, Inc.'s business is primarily funded through advertising. The applications and website are especially made and/or especially adapted for use in infringing the Patents-in-Suit, at least as detailed in the individual Counts above, and are not a staple article or commodity of commerce suitable for substantial non-infringing uses because, among other things, the components sent to users are uniquely designed only to access the infringing aspects of Zillow's website and mobile applications.

212. On information and belief, despite their knowledge of the infringement of the '789 patent, Zillow Group and Zillow, Inc. have intended and continue to intend to induce patent infringement by third parties, including at least the direct infringement by end users and customer, as described in this section. Zillow has and continues to encourage and instruct customers and end users to use Zillow's website and the associated mobile applications in a manner that infringes the '789 patent by advertising the website and mobile applications, providing customer support, and

1 designing their website and mobile applications in such a way that the use of the website and mobile
2 applications by an end user or customer infringes the '789 patent.

3 213. For example, Zillow has encouraged and continues to encourage and instruct
4 customers and end users to use Zillow's website and the associated mobile applications in an
5 infringing manner by providing customer support and designing their website and mobile
6 applications in such a way that the use of the website and mobile applications by an end user or
7 customer infringes the Patents-in-Suit. For example, on information and belief, Zillow's customer
8 service encourages and supports customers and end users in their use of Zillow's website and the
9 associated mobile applications in an infringing manner. For another example,
10 <https://zillow.zendesk.com/hc/en-us> provides direction and support for Zillow's website. On
11 information and belief, to the extent Zillow was not aware that they were encouraging their
12 customers and end users to infringe the '789 patent, its lack of knowledge was based on being
13 willfully blind to the possibility that their acts would cause infringement.

14 214. IBM has been damaged by the infringement of its '789 patent by Zillow and will
15 continue to be damaged by such infringement. IBM is entitled to recover from Zillow the damages
16 sustained by IBM as a result of Zillow's wrongful acts.

17 215. The infringement by Zillow of the '789 patent was, and continues to be, deliberate
18 and willful, entitling IBM to increased damages under 35 U.S.C. § 284 and to attorney fees and costs
19 incurred in prosecuting this action under 35 U.S.C. § 285. In committing these acts of infringement,
20 Zillow actually knew or should have known that its actions constituted an unjustifiably high risk of
21 infringement of a valid and enforceable patent.

22 216. IBM has suffered and continues to suffer irreparable harm, for which there is no
23 adequate remedy at law, and will continue to do so unless Zillow is enjoined therefrom by this Court.
24 In committing these acts of infringement, Zillow actually knew or should have known that their
25 actions constituted an unjustifiably high risk of infringement of a valid and enforceable patent.

217. Zillow alleges that it does not infringe the claims of the '789 patent because the patent claims a specific way of solving a technical problem that Zillow alleges it does not perform through its website and/or mobile applications. *See* Exhibit 95, Appendices 6, 10. Although IBM disagrees with Zillow's contentions, those contentions demonstrate that Zillow agrees that the invention of the '789 patent teaches a particular way to solve a specific technical problem.

COUNT FIVE

INFRINGEMENT OF THE '389 PATENT

218. IBM incorporates by reference paragraphs 1-217.

219. IBM is the owner of all right, title and interest in the '389 patent. The '389 patent was duly and properly issued by the USPTO on March 6, 2007. The '389 patent was duly assigned to IBM. A copy of the '389 patent is attached hereto as Exhibit 58.

220. The '389 patent is valid and enforceable.

221. In violation of 35 U.S.C. § 271, Zillow has infringed, contributed to the infringement of, and/or induced others to infringe one or more of the claims of the '389 patent by having made, designed, offered for sale, sold, provided, used, maintained, and/or supported their website, including at least www.zillow.com, www.zillowgroupmedia.com, and subdomains thereof, and the associated mobile applications, including the Zillow applications for mobile devices running on, for example, the Apple iOS and Google Android operating systems, including at least Zillow Real Estate & Rentals, Zillow Rentals, and Zillow Premier Agent applications. Zillow's infringement is continuing.

222. Zillow Group "operates the largest portfolio of real estate and home-related brands on mobile and the web which focus on all stages of the home lifecycle: renting, buying, selling and financing. . . . The Zillow Group portfolio of consumer brands includes Zillow" ³⁸ Zillow Group's "technology solutions" and actions related to such technology infringe, direct or control

³⁸ Ex. 4 (Zillow Group 2018 10-K) at 3.
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1 infringement, induce infringement, and/or contribute to the infringement through the website and
2 through the mobile application instrumentalities.

3 223. Zillow, Inc. owns and operates the Zillow website, including at least
4 www.zillow.com, www.zillowgroupmedia.com, and subdomains thereof, and the Zillow mobile
5 applications on, for example, the iOS and Android operating systems. Zillow, Inc. provides online
6 real estate listings and related services to consumers and local real estate agents through the website
7 and mobile application instrumentalities.

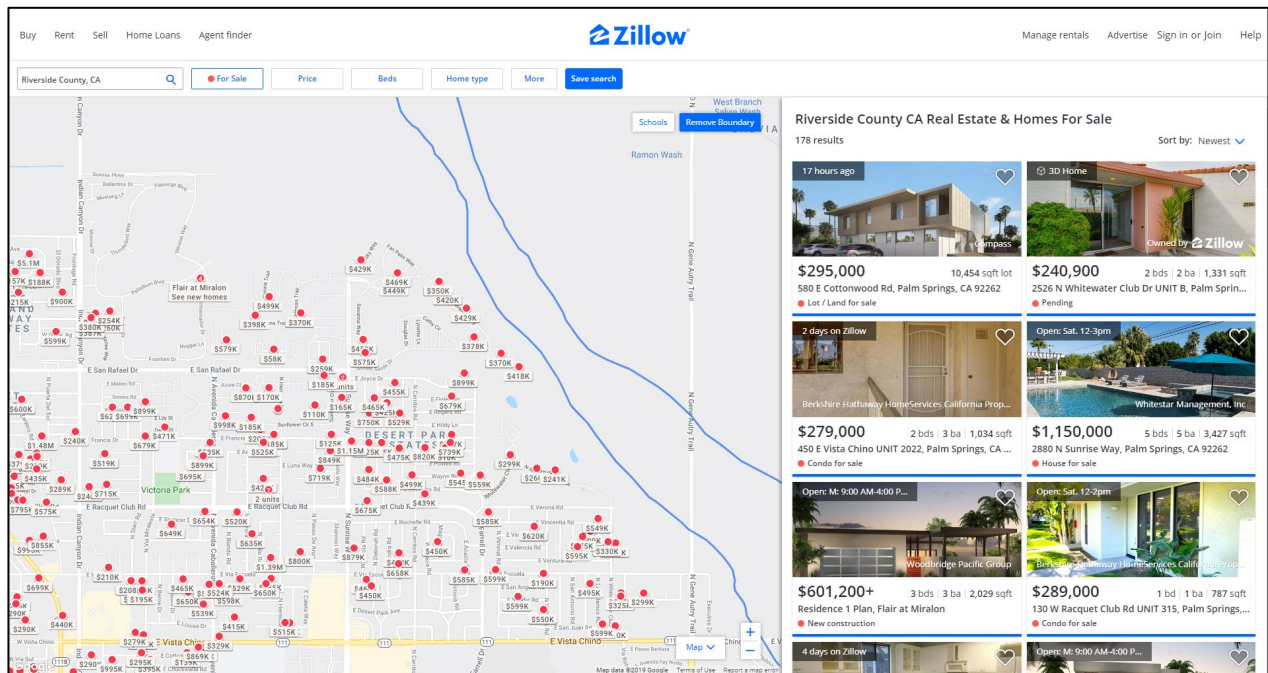
8 224. Zillow Group and Zillow, Inc. directly infringe one or more claims of the '389 patent,
9 including claims 1-6 and 8-17, as described below and in Exhibit 94, Exs. H-L. Additionally, Zillow
10 Group directs and controls the infringing behavior of its agent, Zillow, Inc., which Zillow Group
11 operates and wholly owns.

12 225. For example, as shown in Exhibit 59, the Zillow website and Zillow mobile
13 applications infringe at least claim 1 of the '389 patent at least by:

- 14 a. selecting one or more objects to be displayed in a plurality of layers;
- 15 b. identifying a plurality of non-spatially distinguishable display attributes,
16 wherein one or more of the non-spatially distinguishable display attributes corresponds to each of
17 the layers;
- 18 c. matching each of the objects to one of the layers;
- 19 d. applying the non-spatially distinguishable display attributes corresponding to
20 the layer for each of the matched objects;
- 21 e. determining a layer order for the plurality of layers, wherein the layer order
22 determines a display emphasis corresponding to the objects from the plurality of objects in the
23 corresponding layers; and
- 24 f. displaying the objects with the applied non-spatially distinguishable display
25 attributes based upon the determination, wherein the objects in a first layer from the plurality of

layers are visually distinguished from the objects in the other plurality of layers based upon the non-spatially distinguishable display attributes of the first layer.

226. For another example, Zillow Group and Zillow, Inc. infringe at least claim 1 of the '389 patent through Zillow's website and mobile applications in a similar manner to that shown in the Exhibit 59 claim chart at least when the objects are properties from, or involving, Zillow Group Media; when the objects are properties Zillow owns through Zillow Offers; and when the objects are properties, for example, properties from Promoted Communities for new constructions, properties managed by or associated with Premier Agent, and other properties promoted using Zillow's advertising services.

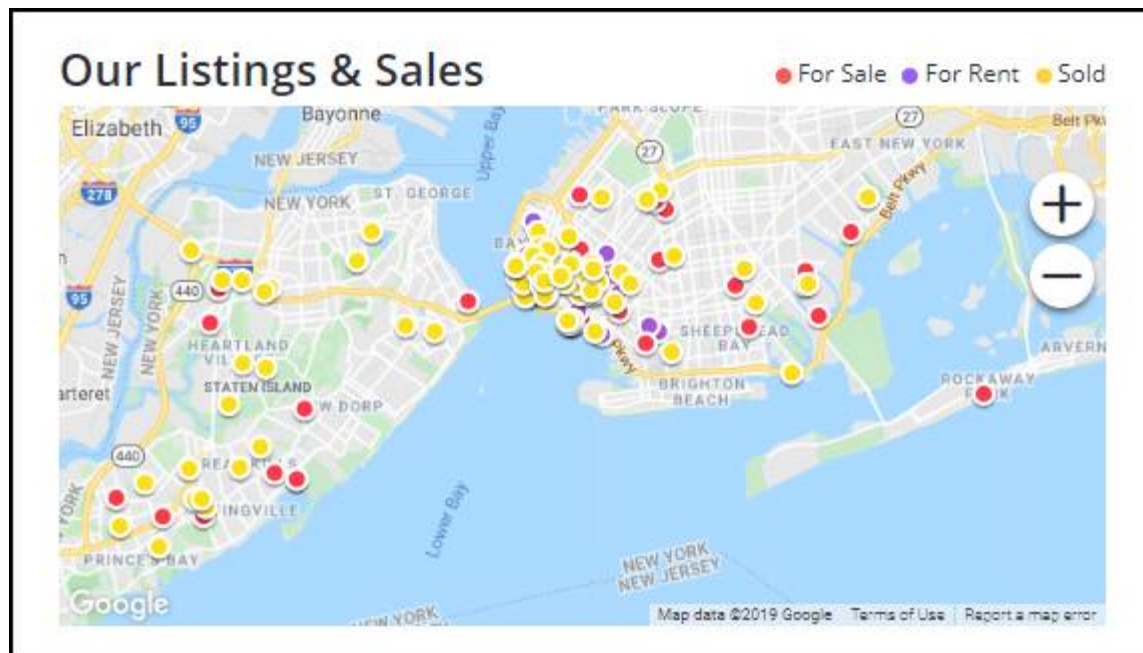


Ex. 44 (Zillow search in Riverside County, CA).



Ex. 45 (<https://www.zillow.com/resources/new-construction/training/inline-community-preview/>).

227. For another example, Zillow Group and Zillow, Inc. infringe at least claim 1 of the '389 patent through the Premier Agent service in at least a similar manner to that shown in the Exhibit 59 claim chart:



Ex. 60 (<https://www.zillow.com/profile/Charles-Fabbella/>).

1 228. The Zillow mobile applications, including at least the Zillow Real Estate & Rentals,
2 Zillow Rentals, and Zillow Premier Agent applications, infringe at least claim 1 of the '389 patent
3 in a similar manner as through the website.

4 229. Alternatively, to the extent that any step of claim 1 of the '389 patent, including the
5 “selecting” or “determining” steps, is performed by a third party (in addition to and/or separate from
6 Zillow’s performance), such as a user, browser, or mobile operating system, that performance is
7 attributable to Zillow, Inc. and Zillow Group at least because each Zillow entity has an agency and/or
8 contractual relationship with said third party and each Zillow entity controls and/or directs the
9 performance of said third party. For example, each Zillow entity controls and/or directs the
10 performance of the “selecting” step by users, browsers, and mobile operating systems because it, for
11 example, conditions receipt of a benefit, such as the ability for users to search for and receive
12 property listings on a map on Zillow’s website and mobile applications, on the performance of the
13 claimed steps, and establishes the manner or timing of the performance by, for example, determining
14 what type of properties are to be returned in a search. For another example, each Zillow entity
15 controls and/or directs the performance of the “selecting” step by users, browsers, and mobile
16 operating systems because it profits from the performance by, for example, increasing use and user
17 interactions from improved search functionality, and each Zillow entity has the right to stop or limit
18 infringement, by, for example, not sending search results requested by the user in this manner.

19 230. Alternatively, to the extent any step of claim 1 of the '389 patent, including the
20 “selecting” or “determining” steps, is performed by a third party (in addition to and/or separate from
21 Zillow’s performance), such as a Content Delivery Network (“CDN”) or other server, including
22 Amazon CloudFront, that performance is attributable to Zillow, Inc. and Zillow Group at least
23 because each Zillow entity has an agency and/or contractual relationship with said third party and
24 each Zillow entity controls and/or directs the performance of said third party. For example, each
25 Zillow entity controls and/or directs the performance of the “selecting” step by CDNs because it, for

1 example, conditions receipt of a benefit, such as payment for services, on the performance of the
2 claimed steps, and establishes the manner or timing of the performance by, for example, determining
3 what type of properties are to be returned in a search. For another example, each Zillow entity
4 controls and/or directs the performance of the “selecting” step by CDNs because it profits from the
5 performance by, for example, increasing use and user interactions from improved search
6 functionality, and each Zillow entity has the right to stop or limit infringement, by, for example, not
7 sending search results requested by the user in this manner.

8 231. Zillow Group and Zillow, Inc. have had knowledge of the ’389 patent and their
9 alleged direct and indirect infringement since January 14, 2019.

10 232. Zillow Group and Zillow, Inc. also indirectly infringe one or more claims of the ’389
11 patent through the Zillow website, including at least www.zillow.com,
12 www.zillowgroupmedia.com, and subdomains thereof, and the Zillow mobile applications. On
13 information and belief, in certain circumstances, client devices and software (e.g., devices and
14 software used by end users and customers of Zillow’s website and the associated mobile
15 applications) directly infringe the ’389 patent through the use of the website and mobile applications
16 to view at least real estate listings. Zillow Group’s Annual Report lists \$1,333,554,000 of revenue
17 from its website and mobile applications which “generate revenue from the sale of advertising
18 services and our suite of marketing software and technology solutions.”³⁹ The revenue indicates that
19 numerous end users and customers used Zillow’s website and the associated mobile applications in
20 order to view real estate listings and thereby infringe the ’389 patent. In particular, to the extent
21 Zillow does not perform the method steps, in certain circumstances, client devices and software (e.g.,
22 devices and software used by end users and customers of Zillow’s website and the associated mobile
23 applications) perform at least the method of displaying layered data recited by claim 1 of the ’389
24 patent as shown in Exhibit 59.

25 ³⁹ Ex. 4 (Zillow Group 2018 10-K) at 3, 42.
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1 233. On information and belief, despite knowledge of the infringement of the '389 patent,
2 Zillow Group and Zillow, Inc. have intended and continue to intend to contribute to patent
3 infringement by third parties by selling, offering to sell, and/or supplying components, and/or a
4 material or apparatus for use in practicing the patented methods of the '389 patent by at least end
5 users and consumers, as described in this section.

6 234. For example Zillow Group and Zillow Inc. provide computer code underlying the
7 Zillow website and mobile applications, such as HTML, JavaScript, and image files, to customers
8 and end users for use in infringing the '389 patent and such computer code does not have substantial
9 non-infringing uses. Such computer code is especially made and/or especially adapted for use in
10 infringing the '389 patent and is not a staple article or commodity of commerce suitable for
11 substantial non-infringing use. The only substantial use of Zillow's computer code responses is for
12 the claimed subject matter involving displaying layered data as described in the '389 patent.

13 235. Further, on information and belief, as a part of providing said computer code, Zillow
14 Group and Zillow, Inc. enter into binding contracts with end users and customers to use Zillow's
15 website and mobile applications, including in an infringing manner including by binding the users
16 to a terms of use for the accused website and mobile applications. On information and belief, Zillow
17 Group and Zillow, Inc. receive valuable consideration from customers and end users located in this
18 judicial district, including information provided by customers and end users, and/or information
19 automatically collected from customers and end users. When customers and end users in this judicial
20 district use the accused website and/or mobile applications, Zillow Group and Zillow, Inc. collect
21 information about the customers and end users, their devices, and their interaction with the accused
22 website and the associated mobile applications. Zillow Group and Zillow, Inc. work with service
23 providers and advertising networks to track and manage cookie information and activities of
24 customers and end users across different websites and devices. Third parties use cookie information
25 collected by Zillow Group and Zillow, Inc. to deliver advertisements to end users and customers

1 based on their use of the accused website and mobile applications. Zillow Group and Zillow, Inc.'s
2 business is primarily funded through advertising. The applications and website are especially made
3 and/or especially adapted for use in infringing the Patents-in-Suit, at least as detailed in the individual
4 Counts above, and are not a staple article or commodity of commerce suitable for substantial non-
5 infringing uses because, among other things, the components sent to users are uniquely designed
6 only to access the infringing aspects of Zillow's website and mobile applications.

7 236. On information and belief, despite their knowledge of the infringement of the '389
8 patent, Zillow Group and Zillow, Inc. have intended and continue to intend to induce patent
9 infringement by third parties, including at least the direct infringement by end users and customer,
10 as described in this section. Zillow has and continues to encourage and instruct customers and end
11 users to use Zillow's website and the associated mobile applications in a manner that infringes the
12 '389 patent by advertising the website and mobile applications, providing customer support, and
13 designing their website and mobile applications in such a way that the use of the website and mobile
14 applications by an end user or customer infringes the '389 patent.

15 237. For example, Zillow has encouraged and continues to encourage and instruct
16 customers and end users to use Zillow's website and the associated mobile applications in an
17 infringing manner by providing customer support and designing their website and mobile
18 applications in such a way that the use of the website and mobile applications by an end user or
19 customer infringes the Patents-in-Suit. For example, on information and belief, Zillow's customer
20 service encourages and supports customers and end users in their use of Zillow's website and the
21 associated mobile applications in an infringing manner. For another example,
22 <https://zillow.zendesk.com/hc/en-us> provides direction and support for Zillow's website. On
23 information and belief, to the extent Zillow was not aware that they were encouraging their
24 customers and end users to infringe the '389 patent, its lack of knowledge was based on being
25 willfully blind to the possibility that their acts would cause infringement.

238. IBM has been damaged by the infringement of its '389 patent by Zillow and will continue to be damaged by such infringement. IBM is entitled to recover from Zillow the damages sustained by IBM as a result of Zillow's wrongful acts.

239. The infringement by Zillow of the '389 patent was, and continues to be, deliberate and willful, entitling IBM to increased damages under 35 U.S.C. § 284 and to attorney fees and costs incurred in prosecuting this action under 35 U.S.C. § 285. In committing these acts of infringement, Zillow actually knew or should have known that its actions constituted an unjustifiably high risk of infringement of a valid and enforceable patent.

240. IBM has suffered and continues to suffer irreparable harm, for which there is no adequate remedy at law, and will continue to do so unless Zillow is enjoined therefrom by this Court. In committing these acts of infringement, Zillow actually knew or should have known that its actions constituted an unjustifiably high risk of infringement of a valid and enforceable patent.

241. Zillow alleges that it does not infringe the claims of the '389 patent because the patent claims a specific way of solving a technical problem that Zillow alleges it does not perform through its website and/or mobile applications. *See* Exhibit 95, Appendices 3, 9. Although IBM disagrees with Zillow's contentions, those contentions demonstrate that Zillow agrees that the invention of the '389 patent teaches a particular way to solve a specific technical problem.

COUNT SIX

INFRINGEMENT OF THE '443 PATENT

242. IBM incorporates by reference paragraphs 1-241.

243. IBM is the owner of all right, title and interest in the '443 patent. The '443 patent was duly and properly issued by the USPTO on July 11, 2006. The '443 patent was duly assigned to IBM. A copy of the '443 patent is attached hereto as Exhibit 61.

244. The '443 patent is valid and enforceable.

245. In violation of 35 U.S.C. § 271, Zillow has infringed, contributed to the infringement of, and/or induced others to infringe one or more of the claims of the '443 patent by having made, designed, offered for sale, sold, provided, used, maintained, and/or supported their website, including at least www.zillow.com, www.zillowgroupmedia.com, and subdomains thereof, and the associated mobile applications, including the Zillow applications for mobile devices running on, for example, the Apple iOS and Google Android operating systems, including at least Zillow Real Estate & Rentals, Zillow Rentals, and Zillow Premier Agent applications. Zillow's infringement is continuing.

246. Zillow Group "operates the largest portfolio of real estate and home-related brands on mobile and the web which focus on all stages of the home lifecycle: renting, buying, selling and financing. . . . The Zillow Group portfolio of consumer brands includes Zillow" ⁴⁰ Zillow Group's "technology solutions" and actions related to such technology infringe, direct or control infringement, induce infringement, and/or contribute to the infringement through the website and through the mobile application instrumentalities.

247. Zillow, Inc. owns and operates the Zillow website, including at least www.zillow.com, www.zillowgroupmedia.com, and subdomains thereof, and the Zillow mobile applications on, for example, the iOS and Android operating systems. Zillow, Inc. provides online real estate listings and related services to consumers and local real estate agents through the website and mobile application instrumentalities.

248. Zillow Group and Zillow, Inc. directly infringe one or more claims of the '443 patent, including claims 1-7, 9-17, and 19-20, as described below and in Exhibit 94, Exs. F-G. Additionally, Zillow Group directs and controls the infringing behavior of its agent, Zillow, Inc., which Zillow Group operates and wholly owns.

⁴⁰ Ex. 4 (Zillow Group 2018 10-K) at 3.
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1 249. For example, as shown in Exhibit 62, the Zillow website and Zillow mobile
2 applications infringe at least claim 1 of the '443 patent at least by:

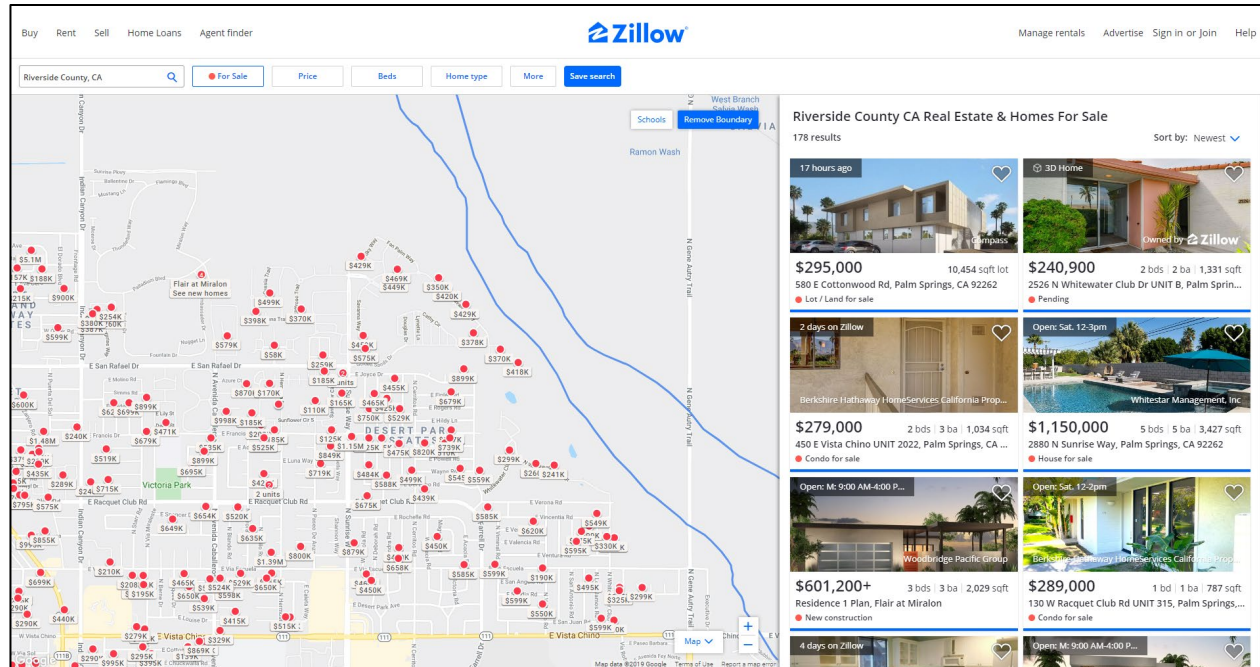
3 a. identifying at least one search result item from a search result of said Internet
4 search by said user;

5 b. searching for said at least one associated advertisement within said repository
6 using said at least one search result item;

7 c. identifying said at least one associated advertisement from said repository
8 having at least one word that matches said at least one search result item; and

9 d. correlating said at least one associated advertisement with said at least one
10 search result item.

11 250. For another example, Zillow Group and Zillow, Inc. infringe at least claim 1 of the
12 '443 patent through Zillow's website and mobile applications in a similar manner to that shown in
13 the Exhibit 62 claim chart at least when the advertising is from, or involves, Zillow Group Media;
14 when the advertising is for properties Zillow owns through Zillow Offers; and when the advertising
15 is for other advertised properties, such as Promoted Communities for new constructions, properties
16 managed by or associated with Premier Agent, and other properties promoted using Zillow's
17 advertising services.



Ex. 44 (Zillow search in Riverside County, CA).

Ex. 45 (<https://www.zillow.com/resources/new-construction/training/inline-community-preview/>).

1 251. The Zillow mobile applications, including at least the Zillow Real Estate & Rentals,
2 Zillow Rentals, and Zillow Premier Agent applications, infringe at least claim 1 of the '443 patent
3 in a similar manner as through the website.

4 252. Alternatively, to the extent that any step of claim 1 of the '443 patent, including the
5 “identifying” step, is performed by a third party (in addition to and/or separate from Zillow’s
6 performance), such as a user, browser, or mobile operating system, that performance is attributable
7 to Zillow, Inc. and Zillow Group at least because each Zillow entity has an agency and/or contractual
8 relationship with said third party and each Zillow entity controls and/or directs the performance of
9 said third party. For example, each Zillow entity controls and/or directs the performance of the
10 “identifying” step by users, browsers, and mobile operating systems because it, for example,
11 conditions receipt of a benefit, such as receiving personalized advertisements, on the performance
12 of the claimed steps, and establishes the manner or timing of the performance by, for example,
13 determining which advertisements are associated with which search result items. For another
14 example, each Zillow entity controls and/or directs the performance of the “identifying” step by
15 users, browsers, and mobile operating systems because it profits from the performance by, for
16 example, increasing use and user interactions from improved targeting of advertisements, and each
17 Zillow entity has the right to stop or limit infringement, by, for example, removing this feature from
18 the Zillow website and applications.

19 253. Alternatively, to the extent any step of claim 1 of the '443 patent, including the
20 “identifying” step, is performed by a third party (in addition to and/or separate from Zillow’s
21 performance), such as a Content Delivery Network (“CDN”) or other server, including Amazon
22 CloudFront, that performance is attributable to Zillow, Inc. and Zillow Group at least because each
23 Zillow entity has an agency and/or contractual relationship with said third party and each Zillow
24 entity controls and/or directs the performance of said third party. For example, each Zillow entity
25 controls and/or directs the performance of the “identifying” step by CDNs because it, for example,

1 conditions receipt of a benefit, such as payment for services, on the performance of the claimed
2 steps, and establishes the manner or timing of the performance by, for example, determining which
3 advertisements are associated with which search result items. For another example, each Zillow
4 entity controls and/or directs the performance of the “identifying” step by CDNs because it profits
5 from the performance by, for example, increasing use and user interactions from improved targeting
6 of advertisements, and each Zillow entity has the right to stop or limit infringement, by, for example,
7 removing this feature from the Zillow website and applications.

8 254. Zillow Group and Zillow, Inc. have had knowledge of the ’443 patent and its alleged
9 direct and indirect infringement since August 26, 2019.

10 255. Zillow Group and Zillow, Inc. also indirectly infringe one or more claims of the ’443
11 patent through the Zillow website, including at least www.zillow.com,
12 www.zillowgroupmedia.com, and subdomains thereof, and the Zillow mobile applications. On
13 information and belief, in certain circumstances, client devices and software (e.g., devices and
14 software used by end users and customers of Zillow’s website and the associated mobile
15 applications) directly infringe the ’443 patent through the use of the website and mobile applications
16 to view at least real estate listings. Zillow Group’s Annual Report lists \$1,333,554,000 of revenue
17 from its website and mobile applications which “generate revenue from the sale of advertising
18 services and our suite of marketing software and technology solutions.”⁴¹ The revenue indicates that
19 numerous end users and customers used Zillow’s website and the associated mobile applications in
20 order to view real estate listings and thereby infringe the ’443 patent. In particular, to the extent
21 Zillow does not perform the method steps, in certain circumstances, client devices and software (e.g.,
22 devices and software used by end users and customers of Zillow’s website and the associated mobile
23 applications) perform at least the method of targeting associated advertisements recited by claim 1
24 of the ’443 patent as shown in Exhibit 62.

25 ⁴¹ Ex. 4 (Zillow Group 2018 10-K) at 3, 42.
SECOND AMENDED COMPLAINT FOR PATENT
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1 256. On information and belief, despite knowledge of the infringement of the '443 patent,
2 Zillow Group and Zillow, Inc. have intended and continue to intend to contribute to patent
3 infringement by third parties by selling, offering to sell, and/or supplying components, and/or a
4 material or apparatus for use in practicing the patented methods of the '443 patent by at least end
5 users and consumers, as described in this section.

6 257. For example Zillow Group and Zillow Inc. provide computer code underlying the
7 Zillow website and mobile applications, such as HTML, JavaScript, and image files, to customers
8 and end users for use in infringing the '443 patent and such computer code does not have substantial
9 non-infringing uses. Such computer code is especially made and/or especially adapted for use in
10 infringing the '443 patent and is not a staple article or commodity of commerce suitable for
11 substantial non-infringing use. The only substantial use of Zillow's computer code responses is for
12 the claimed subject matter involving targeting associated advertisements as described in the '443
13 patent.

14 258. Further, on information and belief, as a part of providing said computer code, Zillow
15 Group and Zillow, Inc. enter into binding contracts with end users and customers to use Zillow's
16 website and mobile applications, including in an infringing manner including by binding the users
17 to a terms of use for the accused website and mobile applications. On information and belief, Zillow
18 Group and Zillow, Inc. receive valuable consideration from customers and end users located in this
19 judicial district, including information provided by customers and end users, and/or information
20 automatically collected from customers and end users. When customers and end users in this judicial
21 district use the accused website and/or mobile applications, Zillow Group and Zillow, Inc. collect
22 information about the customers and end users, their devices, and their interaction with the accused
23 website and the associated mobile applications. Zillow Group and Zillow, Inc. work with service
24 providers and advertising networks to track and manage cookie information and activities of
25 customers and end users across different websites and devices. Third parties use cookie information

1 collected by Zillow Group and Zillow, Inc. to deliver advertisements to end users and customers
2 based on their use of the accused website and mobile applications. Zillow Group and Zillow, Inc.'s
3 business is primarily funded through advertising. The applications and website are especially made
4 and/or especially adapted for use in infringing the Patents-in-Suit, at least as detailed in the individual
5 Counts above, and are not a staple article or commodity of commerce suitable for substantial non-
6 infringing uses because, among other things, the components sent to users are uniquely designed
7 only to access the infringing aspects of Zillow's website and mobile applications.

8 259. On information and belief, despite their knowledge of the infringement of the '443
9 patent, Zillow Group and Zillow, Inc. have intended and continue to intend to induce patent
10 infringement by third parties, including at least the direct infringement by end users and customer,
11 as described in this section. Zillow has and continues to encourage and instruct customers and end
12 users to use Zillow's website and the associated mobile applications in a manner that infringes the
13 '443 patent by advertising the website and mobile applications, providing customer support, and
14 designing their website and mobile applications in such a way that the use of the website and mobile
15 applications by an end user or customer infringes the '443 patent.

16 260. For example, Zillow has encouraged and continues to encourage and instruct
17 customers and end users to use Zillow's website and the associated mobile applications in an
18 infringing manner by providing customer support and designing their website and mobile
19 applications in such a way that the use of the website and mobile applications by an end user or
20 customer infringes the Patents-in-Suit. For example, on information and belief, Zillow's customer
21 service encourages and supports customers and end users in their use of Zillow's website and the
22 associated mobile applications in an infringing manner. For another example,
23 <https://zillow.zendesk.com/hc/en-us> provides direction and support for Zillow's website. As of
24 November 11, 2019, Zillow continues to instructs its customers and end users to view related listings
25 on the accused website without having to return to the search page or select filters in a way that

1 infringes at least claim 1 of the '443 patent.⁴² On information and belief, to the extent Zillow was
2 not aware that they were encouraging their customers and end users to infringe the '443 patent, its
3 lack of knowledge was based on being willfully blind to the possibility that their acts would cause
4 infringement.

5 261. IBM has been damaged by the infringement of its '443 patent by Zillow and will
6 continue to be damaged by such infringement. IBM is entitled to recover from Zillow the damages
7 sustained by IBM as a result of Zillow's wrongful acts.

8 262. The infringement by Zillow of the '443 patent was, and continues to be, deliberate
9 and willful, entitling IBM to increased damages under 35 U.S.C. § 284 and to attorney fees and costs
10 incurred in prosecuting this action under 35 U.S.C. § 285. In committing these acts of infringement,
11 Zillow actually knew or should have known that its actions constituted an unjustifiably high risk of
12 infringement of a valid and enforceable patent.

13 263. IBM has suffered and continues to suffer irreparable harm, for which there is no
14 adequate remedy at law, and will continue to do so unless Zillow is enjoined therefrom by this Court.
15 In committing these acts of infringement, Zillow actually knew or should have known that their
16 actions constituted an unjustifiably high risk of infringement of a valid and enforceable patent.

17 264. Zillow alleges that it does not infringe the claims of the '443 patent because the patent
18 claims a specific way of solving a technical problem that Zillow alleges it does not perform through
19 its website and/or mobile applications. *See* Exhibit 95, Appendix 2. Although IBM disagrees with
20 Zillow's contentions, those contentions demonstrate that Zillow agrees that the invention of the '443
21 patent teaches a particular way to solve a specific technical problem.

22 **COUNT SEVEN**

23 **INFRINGEMENT OF THE '904 PATENT**

24 265. IBM incorporates by reference paragraphs 1-264.

25 ⁴² Ex. 63 (<https://www.zillow.com/tech/embedding-similar-home-recommendation/>).

1 266. IBM is the owner of all right, title and interest in the '904 patent. The '904 patent
2 was duly and properly issued by the USPTO on Nov. 20, 2012. The '904 patent was duly assigned
3 to IBM. A copy of the '904 patent is attached hereto as Exhibit 64.

4 267. The '904 patent is valid and enforceable.

5 268. In violation of 35 U.S.C. § 271, Zillow has infringed, contributed to the infringement
6 of, and/or induced others to infringe one or more of the claims of the '904 patent by having made,
7 designed, offered for sale, sold, provided, used, maintained, and/or supported its website, including
8 at least www.zillow.com, www.zillowgroupmedia.com, and subdomains thereof, and the associated
9 mobile applications, including the Zillow applications for mobile devices running on, for example,
10 the Apple iOS and Google Android operating systems, including at least Zillow Real Estate &
11 Rentals, Zillow Rentals, and Zillow Premier Agent applications. Zillow's infringement is
12 continuing.

13 269. Zillow Group "operates the largest portfolio of real estate and home-related brands
14 on mobile and the web which focus on all stages of the home lifecycle: renting, buying, selling and
15 financing. . . . The Zillow Group portfolio of consumer brands includes Zillow" ⁴³ Zillow
16 Group's "technology solutions" and actions related to such technology infringe, direct or control
17 infringement, induce infringement, and/or contribute to the infringement through the website and
18 through the mobile application instrumentalities.

19 270. Zillow, Inc. owns and operates the Zillow website, including at least
20 www.zillow.com, www.zillowgroupmedia.com, and subdomains thereof, and the Zillow mobile
21 applications on, for example, the iOS and Android operating systems. Zillow, Inc. provides online
22 real estate listings and related services to consumers and local real estate agents through the website
23 and mobile application instrumentalities.

24
25 ⁴³ Ex. 4 (Zillow Group 2018 10-K) at 3.
SECOND AMENDED COMPLAINT FOR PATENT
INFRINGEMENT - 103
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1 271. Zillow Group and Zillow, Inc. directly infringe one or more claims of the '904 patent,
2 including claims 1-5 and 7-10, as described below and in Exhibit 94, Exs. M-N. Additionally, Zillow
3 Group directs and controls the infringing behavior of its agent, Zillow, Inc., which Zillow Group
4 operates and wholly owns.

5 272. For example, as shown in Exhibit 65, the Zillow website and Zillow mobile
6 applications infringe at least claim 1 of the '904 patent at least by:

7 a. producing, by one or more computers, a promotion list for a promotion
8 management campaign by:

9 b. generating, by one or more computers, a promotion instance from a promotion
10 template;

11 c. receiving, by one or more computers executing marketing campaign software,
12 a search query that includes one or more attributes of a promotion instance;

13 d. searching one or more data repositories for promotion instances having
14 attributes corresponding to the attributes specified in the search query;

15 e. returning a list including one or more promotion instances having the
16 attributes corresponding to the attributes specified in the search query;

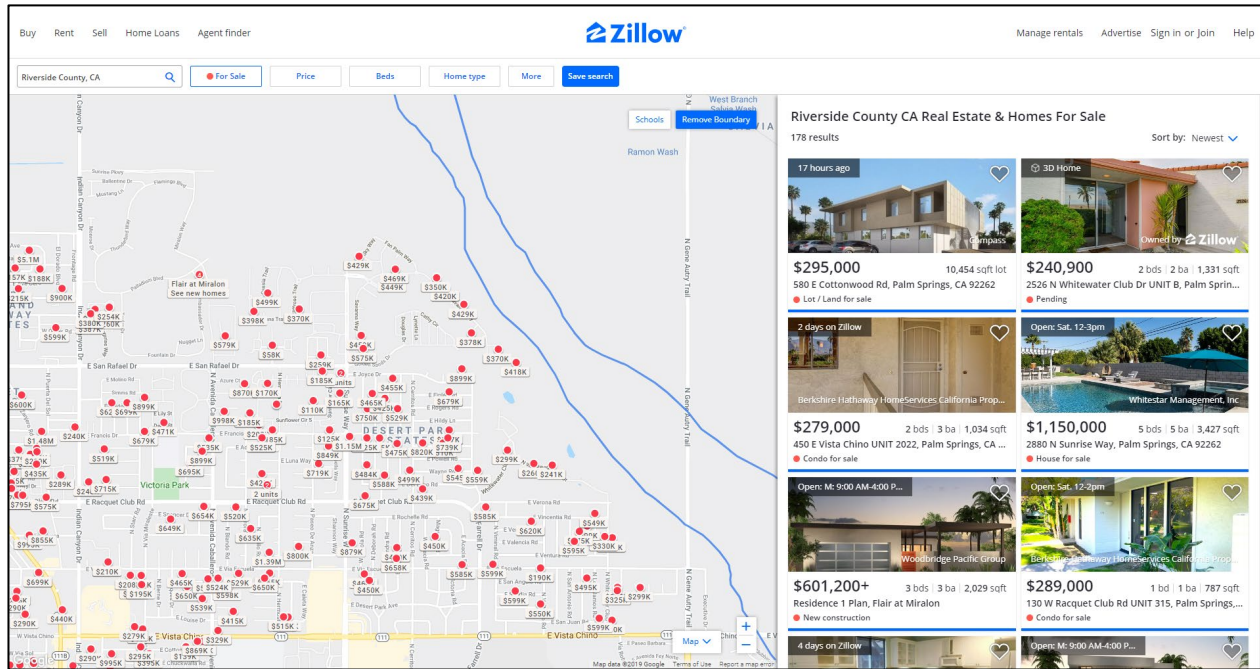
17 f. receiving, by the one or more computers, a selection of one or more promotion
18 instances, from the returned list, to be included in the promotion list;

19 g. assigning the selected promotion instances to the promotions list; and

20 h. storing the promotion list in an electronic medium.

21 273. For another example, Zillow Group and Zillow, Inc. infringe at least claim 1 of the
22 '904 patent through Zillow's website and mobile applications in a similar manner to that shown in
23 the Exhibit 65 claim chart at least when the advertising is from, or involves, Zillow Group Media;
24 when the advertising is for properties Zillow owns through Zillow Offers; and when the advertising
25 is for other advertised properties, such as Promoted Communities for new constructions, properties

managed by or associated with Premier Agent, and other properties promoted using Zillow's advertising services.

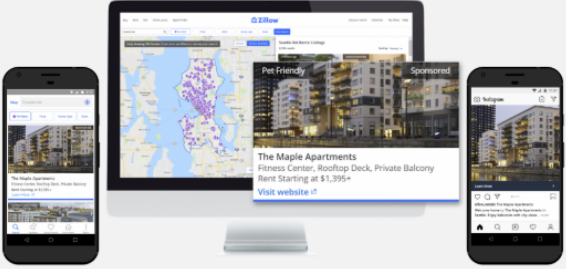


Ex. 44 (Zillow search in Riverside County, CA).



Ex. 45 (<https://www.zillow.com/resources/new-construction/training/inline-community-preview/>).

How it works



AMPLIFIED LOCAL EXPOSURE
Drive renters in preselected markets directly to your community's website or listing.

PREMIUM PLACEMENT
Customizable ad content appears in a prominent location within listing search results.

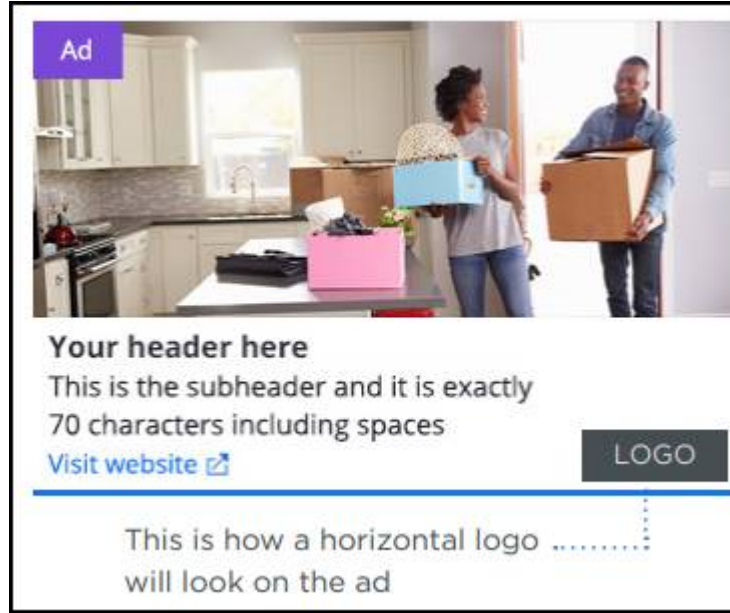
CUSTOMIZABLE
Highlight what matters to your community — including available floorplans, concessions and amenities.

FLEXIBLE
Choose between a low, medium or high number of impressions and a variety of available contract lengths.

Ex. 46 (<https://www.zillow.com/marketing/rental-property-advertising/>).

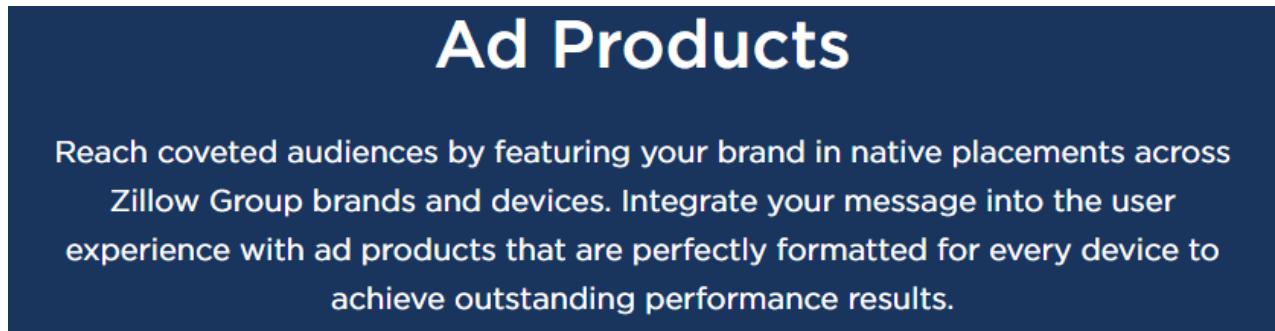
274. For another example, Zillow Group and Zillow, Inc. infringe at least claim 1 of the '904 patent through the Zillow Group Media service in at least a similar manner to that shown in the Exhibit 65 claim chart:

AD SPECIFICATIONS	
EXECUTION	Client provides image/logo, copy for header and sub-header Client provides click through URL and tracking
IMAGE / LOGO	1.) Rectangular image: 828px width x 372px height (image will be scaled down but this asset is 2x larger to accommodate Retina displays) max file size 100k; image must not contain a logo or copy; clear, crisp, beautiful images work best; supported creative types: jpeg, gif or png 2.) Logo: width of 220px cropped to all edges (logo will be scaled down but this asset is 2x larger to accommodate Retina displays) max file size 50k; supported creative types: gif or png. No white logos as they will not display.
HEADER	Up to 25 characters including spaces* Copy must not include special characters, italicized letters, or be in all capitals
SUBHEADER	Up to 70 characters including spaces* Copy must not include special characters, italicized letters, or be in all capitals
PLATFORMS	Mobile and Desktop search pages (Zillow and Trulia)
LEAD TIME	Assets due: 5 business days prior to launch date
CONTACT US	Please contact brandadvertising@zillow.com with any questions



Ex. 66 (<https://www.zillowgroupmedia.com/wp-content/uploads/2019/10/Zillow-Group-Native-Search-Ad.pdf>).

275. For another example, Zillow Group and Zillow, Inc. infringe at least claim 1 of the '904 patent through the Zillow Group Media service in at least a similar manner to that shown in the Exhibit 65 claim chart:



Ex. 47 (<https://www.zillowgroupmedia.com/native-ads/>).

1 276. The Zillow mobile applications, including at least the Zillow Real Estate & Rentals,
2 Zillow Rentals, and Zillow Premier Agent applications, infringe at least claim 1 of the '904 patent
3 in a similar manner as through the website.

4 277. Alternatively, to the extent that any step of claim 1 of the '904 patent, including the
5 “receiving” step, is performed by a third party (in addition to and/or separate from Zillow’s
6 performance), such as a user, browser, or mobile operating system, that performance is attributable
7 to Zillow, Inc. and Zillow Group at least because each Zillow entity has an agency and/or contractual
8 relationship with said third party and each Zillow entity controls and/or directs the performance of
9 said third party. For example, each Zillow entity controls and/or directs the performance of the
10 “receiving” step by users, browsers, and mobile operating systems because it, for example,
11 conditions receipt of a benefit, such as improved quality of search results, on the performance of the
12 claimed steps, and establishes the manner or timing of the performance by, for example, determining
13 which search results will be returned to the user. For another example, each Zillow entity controls
14 and/or directs the performance of the “receiving” step by users, browsers, and mobile operating
15 systems because it profits from the performance by, for example, increasing use and user interactions
16 from improved search results, and each Zillow entity has the right to stop or limit infringement, by,
17 for example, using a different method to return search results to a user.

18 278. Alternatively, to the extent any step of claim 1 of the '904 patent, including the
19 “receiving” step, is performed by a third party (in addition to and/or separate from Zillow’s
20 performance), such as a Content Delivery Network (“CDN”) or other server, including Amazon
21 CloudFront, that performance is attributable to Zillow, Inc. and Zillow Group at least because each
22 Zillow entity has an agency and/or contractual relationship with said third party and each Zillow
23 entity controls and/or directs the performance of said third party. For example, each Zillow entity
24 controls and/or directs the performance of the “receiving” step by CDNs because it, for example,
25 conditions receipt of a benefit, such as payment for services, on the performance of the claimed

1 steps, and establishes the manner or timing of the performance by, for example, determining which
2 search results will be returned to the user. For another example, each Zillow entity controls and/or
3 directs the performance of the “receiving” step by CDNs because it profits from the performance by,
4 for example, increasing use and user interactions from improved search results, and each Zillow
5 entity has the right to stop or limit infringement, by, for example, using a different method to return
6 search results to a user.

7 279. Zillow Group and Zillow, Inc. have had knowledge of the ’904 patent and its alleged
8 direct and indirect infringement since August 26, 2019.

9 280. Zillow Group and Zillow, Inc. also indirectly infringe one or more claims of the ’904
10 patent through the Zillow website, including at least www.zillow.com,
11 www.zillowgroupmedia.com, and subdomains thereof, and the Zillow mobile applications. On
12 information and belief, in certain circumstances, client devices and software (e.g., devices and
13 software used by end users and customers of Zillow’s website and the associated mobile
14 applications) directly infringe the ’904 patent through the use of the website and mobile applications
15 to view at least real estate listings. Zillow Group’s Annual Report lists \$1,333,554,000 of revenue
16 from its website and mobile applications which “generate revenue from the sale of advertising
17 services and our suite of marketing software and technology solutions.”⁴⁴ The revenue indicates that
18 numerous end users and customers used Zillow’s website and the associated mobile applications in
19 order to view real estate listings and thereby infringe the ’904 patent. In particular, to the extent
20 Zillow does not perform the method steps, in certain circumstances, client devices and software (e.g.,
21 devices and software used by end users and customers of Zillow’s website and the associated mobile
22 applications) perform at least the method of producing a promotion list recited by claim 1 of the ’904
23 patent as shown in Exhibit 65.

24
25 ⁴⁴ Ex. 4 (Zillow Group 2018 10-K) at 3, 42.
SECOND AMENDED COMPLAINT FOR PATENT
INFRINGEMENT - 109
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1 281. On information and belief, despite knowledge of the infringement of the '904 patent,
2 Zillow Group and Zillow, Inc. have intended and continue to intend to contribute to patent
3 infringement by third parties by selling, offering to sell, and/or supplying components, and/or a
4 material or apparatus for use in practicing the patented methods of the '904 patent by at least end
5 users and consumers, as described in this section.

6 282. For example Zillow Group and Zillow Inc. provide computer code underlying the
7 Zillow website and mobile applications, such as HTML, JavaScript, and image files, to customers
8 and end users for use in infringing the '904 patent and such computer code does not have substantial
9 non-infringing uses. Such computer code is especially made and/or especially adapted for use in
10 infringing the '904 patent and is not a staple article or commodity of commerce suitable for
11 substantial non-infringing use. The only substantial use of Zillow's computer code responses is for
12 the claimed subject matter involving returning a promotion list as described in the '904 patent.

13 283. Further, on information and belief, as a part of providing said computer code, Zillow
14 Group and Zillow, Inc. enter into binding contracts with end users and customers to use Zillow's
15 website and mobile applications, including in an infringing manner including by binding the users
16 to a terms of use for the accused website and mobile applications. On information and belief, Zillow
17 Group and Zillow, Inc. receive valuable consideration from customers and end users located in this
18 judicial district, including information provided by customers and end users, and/or information
19 automatically collected from customers and end users. When customers and end users in this judicial
20 district use the accused website and/or mobile applications, Zillow Group and Zillow, Inc. collect
21 information about the customers and end users, their devices, and their interaction with the accused
22 website and the associated mobile applications. Zillow Group and Zillow, Inc. work with service
23 providers and advertising networks to track and manage cookie information and activities of
24 customers and end users across different websites and devices. Third parties use cookie information
25 collected by Zillow Group and Zillow, Inc. to deliver advertisements to end users and customers

1 based on their use of the accused website and mobile applications. Zillow Group and Zillow, Inc.'s
2 business is primarily funded through advertising. The applications and website are especially made
3 and/or especially adapted for use in infringing the Patents-in-Suit, at least as detailed in the individual
4 Counts above, and are not a staple article or commodity of commerce suitable for substantial non-
5 infringing uses because, among other things, the components sent to users are uniquely designed
6 only to access the infringing aspects of Zillow's website and mobile applications.

7 284. On information and belief, despite their knowledge of the infringement of the '904
8 patent, Zillow Group and Zillow, Inc. have intended and continue to intend to induce patent
9 infringement by third parties, including at least the direct infringement by end users and customer,
10 as described in this section. Zillow has and continues to encourage and instruct customers and end
11 users to use Zillow's website and the associated mobile applications in a manner that infringes the
12 '904 patent by advertising the website and mobile applications, providing customer support, and
13 designing their website and mobile applications in such a way that the use of the website and mobile
14 applications by an end user or customer infringes the '904 patent.

15 285. For example, Zillow has encouraged and continues to encourage and instruct
16 customers and end users to use Zillow's website and the associated mobile applications in an
17 infringing manner by providing customer support and designing their website and mobile
18 applications in such a way that the use of the website and mobile applications by an end user or
19 customer infringes the Patents-in-Suit. For example, on information and belief, Zillow's customer
20 service encourages and supports customers and end users in their use of Zillow's website and the
21 associated mobile applications in an infringing manner. For another example,
22 <https://zillow.zendesk.com/hc/en-us> provides direction and support for Zillow's website. On
23 information and belief, to the extent Zillow was not aware that they were encouraging their
24 customers and end users to infringe the '904 patent, its lack of knowledge was based on being
25 willfully blind to the possibility that their acts would cause infringement.

1 286. IBM has been damaged by the infringement of its '904 patent by Zillow and will
2 continue to be damaged by such infringement. IBM is entitled to recover from Zillow the damages
3 sustained by IBM as a result of Zillow's wrongful acts.

4 287. The infringement by Zillow of the '904 patent was, and continues to be, deliberate
5 and willful, entitling IBM to increased damages under 35 U.S.C. § 284 and to attorney fees and costs
6 incurred in prosecuting this action under 35 U.S.C. § 285. In committing these acts of infringement,
7 Zillow actually knew or should have known that its actions constituted an unjustifiably high risk of
8 infringement of a valid and enforceable patent.

9 288. IBM has suffered and continues to suffer irreparable harm, for which there is no
10 adequate remedy at law, and will continue to do so unless Zillow is enjoined therefrom by this Court.
11 In committing these acts of infringement, Zillow actually knew or should have known that their
12 actions constituted an unjustifiably high risk of infringement of a valid and enforceable patent.

13 289. Zillow alleges that it does not infringe the claims of the '904 patent because the patent
14 claims a specific way of solving a technical problem that Zillow alleges it does not perform through
15 its website and/or mobile applications. *See* Exhibit 95, Appendix 5. Although IBM disagrees with
16 Zillow's contentions, those contentions demonstrate that Zillow agrees that the invention of the '904
17 patent teaches a particular way to solve a specific technical problem.

18 **RELIEF REQUESTED**

19 Wherefore, IBM respectfully requests that this Court enter judgment against the Defendants
20 as follows:

- 21 A. That the '849 patent has been and continues to be infringed by Defendants;
- 22 B. That Defendants' infringement of the '849 patent has been willful;
- 23 C. An injunction against further infringement of the '849 patent;
- 24 D. That the '346 patent has been and continues to be infringed by Defendants;
- 25 E. That Defendants' infringement of the '346 patent has been willful;

- 1 F. An injunction against further infringement of the '346 patent;
- 2 G. That the '183 patent has been and continues to be infringed by Defendants;
- 3 H. That Defendants' infringement of the '183 patent has been willful;
- 4 I. An injunction against further infringement of the '183 patent;
- 5 J. That the '789 patent has been and continues to be infringed by Defendants;
- 6 K. That Defendants' infringement of the '789 patent has been willful;
- 7 L. An injunction against further infringement of the '789 patent;
- 8 M. That the '389 patent has been and continues to be infringed by Defendants;
- 9 N. That Defendants' infringement of the '389 patent has been willful;
- 10 O. An injunction against further infringement of the '389 patent;
- 11 P. That the '443 patent has been and continues to be infringed by Defendants;
- 12 Q. That Defendants' infringement of the '443 patent has been willful;
- 13 R. An injunction against further infringement of the '443 patent;
- 14 S. That the '904 patent has been and continues to be infringed by Defendants;
- 15 T. That Defendants' infringement of the '904 patent has been willful;
- 16 U. An injunction against further infringement of the '904 patent;
- 17 V. An award of damages adequate to compensate IBM for the patent infringement that has
- 18 occurred pre-verdict and for damages that occur post-verdict, together with pre-judgment interest
- 19 and costs;
- 20 W. An award of all other damages permitted by 35 U.S.C. § 284, including increased
- 21 damages up to three times the amount of compensatory damages found;
- 22 X. That this is an exceptional case and an award to IBM of its costs and reasonable
- 23 attorneys' fees incurred in this action as provided by 35 U.S.C. § 285; and
- 24 Y. Such other relief as this Court deems just and proper.
- 25

DEMAND FOR JURY TRIAL

IBM hereby demands trial by jury on all claims and issues so triable

DATED this 8th day of March, 2021.

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